The Builder.

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Still in London.

IN those comprehensive and instructive glances which the accomplished naturalist casts from time to time over the surface of the planet Earth, he regards with interest those migratory movements by which furred or feathered wanderers follow the declination of the sun. The clouds of quails which fly by night over the Mediterranean, and, alighting on the Italian shores, set forth (so many of them, at least, as escape the pouched nets erected for their reception) on a rapid pedestrian journey into France, may be awaited almost to a day. The great swift, that whirls through our villages, shrieking with delight or with eagerness, in pursuit of his insect prey, has travelled to our shores from Senegal, at the rate of seventy miles per hour, a speed now no longer attained by the express trains of the Great Western Railway. The number of degrees of latitude covered by this rapid traveller exceeds the ordinary range of any except human wanderers; but wherever the map of the Old World may be studied at appropriate periods, we shall find marks of the constant self-adjustment of animal abode to the change of season.

Artificial, conventional, civilised life is subject to the same element of disturbance, and follows, to some extent, the same laws. A philosopher of that modern school which, after unceremoniously throwing overboard the greater part of that which is most surely received among us, has been compelled to invent the facts on which the previously invented theories are to be supported, would probably astonish us with the synchronisms to be remarked in our own island in the months of August and September. Three days before the festival of the Assumption of the Virgin, he would say, a remarkable migration of a large gallinaceous bird called the Tetrao takes place into the United Kingdom, and specimens are to be met with not only on Cumberland and Scotch moors, but simultaneously, and in great numbers, in the streets of London—no doubt exhausted by fatigue—so that the inhabitants of that metropolis, who remain there for that express purpose, invariably celebrate the Feast of the Assumption by partaking of the flesh of that bird. Seventeen days later a similar phenomenon may be expected to occur with the same regularity, it being remarkable that the second influx of birds consists of those of another species, smaller in size and lighter in colour, but appearing in the same sudden manner over the whole country. It also has been observed that the species of club, or rhetorical exhibition, which has come to replace the ancient Saxon wittenagemote, usually comes to a close between these two gallinaceous immigrations, and that this event is invariably preceded by the capture in the river Thames, in the vicinity of Greenwich, of large shoals of a very small fish, peculiar to the river and to the season, on which the Cabinet Councillors are, by virtue of their oaths taken on appointment, bound annually to feast in the hospital erected in that town.

If we exchange the style of language and of thought borrowed thus from our German neighbours for our own plainer vernacular, we shall have occasion to congratulate such of our readers as are more or less restricted to a metropolitan residence, on one result of the Parliamentary session of 1867. Before rushing northward or westward for the solemnities of the 1st of September, or at least for that mouthful of country air which the torrid heat of 86 degrees of Fahrenheit in the shade has rendered so absolutely necessary to comfort and to health, the Legislature has passed one measure highly calculated to save the time of the residents in, and visitors to, London, from its most amazing mode of consumption. While men of all parties and of all antecedents have been gaily consenting to take a more unprecedented leap in the dark than English history has yet witnessed, but of which we are not at all afraid, we find with no less surprise than gratitude that a practical measure of real and necessary reform has actually escaped the murder of the innocents, and struggled into legal existence. The Legislature which could calmly and with perfect indifference survey the ruin which its own ill-considered and contradicting action had brought on that great interest to which the internal communications of the country have been committed with so little precaution, has been moved to forbid obstructions to the Cabs in which honourable members may have occasion to visit their stockbrokers. There was of course a great outcry. It was held to be a tyrannical invasion of the rights secured by Magna Charta, to prevent any resident in a great thoroughfare from having in his coals or his beer at any moment which either he, or his coal-merchant, or his brewer, might find most perfectly convenient, the incidental block of the entire east and west traffic of the city for five or ten minutes being one of those trifles with which such independent resident had no concern. Why should the coal-heaver be forced to get up an hour or two earlier in order that the banker's brougham might save a quarter of an hour in the middle of the day? Could any specimen of class legislation be more odiously unfair? Where is the hereditary freedom of the Englishman if he is liable to be ordered by a man in a felt helmet to go through one of two parallel streets rather than through another, for the simple reason of expediting the general movement of a city traffic? These champions of inconvenient freedom have, however, at length, been worsted, and it will now be distinctly the fault of the police authorities if London continue to be the city in which, while the traffic is the most enormous in the world, it is at the same time the most confused and unregulated. That a moderate amount of activity and intelligence on the part of the directors of the police would have done much to render the Bill for the Regulation of Metropolitan Traffic unnecessary, we think few who have watched the neighbourhood of St. James's-street on Court-days can doubt. But now, at all events, all doubt as to the full legality of preventing persons from inconveniencing one another by sheer pig-headedness is at an end, and we trust that regulations at once simple and efficient will be intelligently made and unhesitatingly enforced.

The importance of the relief which the introduction of system in the place of irresponsible confusion is calculated to give to the street traffic, has received, within the last few days, an illustration from an unexpected source. If the emoluments of the coroner depend on the number of fatal accidents as to which he may be called upon to hold an investigation, the independent and defiant liberty with which every carman and cabman in London has hitherto driven across his neighbour's path, must have been a great source of gain to that lugubrious functionary. But a new field has opened to his exertions. When the engineer suggested that the traffic of London might be carried on in two stories, and that a new system of thorough communication might be wrested from the dominion of the rats, the water-pipes, and the sewers, it might have been expected that the palpable necessity of providing a respirable atmosphere for the intended passengers would not have been left out of sight. How completely and inexcusably this has been done we have not now for the first time to complain. Very few persons who have come underground, say from Edgware-road to King's Cross, about three or four o'clock in the day, will think any language that we can venture to print sufficiently strong to reprobate the intolerable and stifling atmosphere into which those passengers have to descend who seek to shun the fierce sun of the streets, and the intermitting torture of the public conveyances. But now that we have the authority of the coroner for attributing death *directly* to the atmosphere of the Underground Railway, we trust that the directors of that enterprise will feel convinced that it will pay to attend to the ventilation of their pestiferous tunnels. The traffic on the railway is enormous, and, conducted as it is by fully adequate locomotive power, and unimpeded by the delays caused by junctions, or by the charging and discharging of luggage, it is calculated to relieve the streets almost entirely of a large amount of through traffic, were it not for this one grand obstacle, want of ventilation. There can, we should think, be little doubt that a due attention to this essential requisite of comfort would very largely increase the traffic of the Metropolitan Railway. If people could convey their own oxygen, like water spiders in an aquarium, very few would hesitate between the cost of a cab or the discomfort of an omnibus on the one hand, and the punctuality, speed, and easy motion of a railway carriage on the other. As it is, the long lines of omnibus are not only far better served, but appear to be more numerously supported than was the case before the piercing of the tunnel under the New-road. How much of this active support of the more cumbrous, interrupted, and crowded mode of transit is due to the stifling atmosphere of the tunnel, we suppose the Metropolitan directors have never calculated. But a little reflection only is necessary in order to arrive at the conclusion that nature in this, as in other cases, tacitly asserts her rights. The man who now hesitates whether to take a ticket by railway or to reach the City by some above ground conveyance, may not be at all aware how much his choice is influenced by dim remembrances of former escapes from suffocation. But, on the other hand, supply the shorter and easier route with respirable air, washed and dried if you like, like that furnished to the Houses of Parliament, but at all events not overloaded with the products of respiration and of combustion, and he will not hesitate at all. One would no more think of going from Paddington to the City by omnibus than of posting from London to Birmingham, were it not for the fact that it is difficult to respire on the route when conveyed underground. Now that it appears that what all travellers have felt to be a painful difficulty may in a given case become a positive impossibility, we trust that those responsible for the metropolitan traffic will not be in vain appealed to in that most sensitive part of the official organisation—the pocket.

One other reflection may occur to the fugitive from London, pursued as he is by the dreary aspect of brick-making suburbs down to West Drayton and even to Slough, or met by the heavy veil peculiar to the island metropolis when

wafted by easterly winds almost to the Royal Keep of Windsor. The Thames has actually ceased to be an open sewer; the quality of the drinking water supplied to the metropolis has engaged much and beneficial attention. Our ways are about to be set in order; and in the rapid rebuilding of many districts of the hundred and twenty square miles of town, many noticeable artistic features are daily springing up. The river-wall of the Thames is rising. But we all remember, with a scarce suppressed shudder, that during the part of the year when the game are all shot, the croquet grounds made unpleasant by the damp, the compulsory inactivity of John Doe and Richard Roe is at an end, and duty or necessity, in one form or another, is repeopling the dense abodes of the metropolis, it is not the normal state of things for London to be visible. The November fog season awaits our return: the combination of the vapour of the Thames valley with the unconsumed and floating dust arising from our wasteful and unmechanical mode of burning our daily supply of fourteen thousand tons of coal, which makes all London at times somewhat of a subterranean city. Even here there is hope. Mighty is the power of the pocket. To burn coal economically, instead of to volatilise 30 per cent. of that which we purchase in the form of smoke, and to send half of the heat produced up the chimnies, has been as yet too hard a task for us to accomplish. Gradual and enlightened reform in a matter of this kind, perhaps of any kind, is not altogether germane to the English character. But when a new feature is introduced, when a new power comes into play, great and salutary improvements often accompany it, as if of their own accord. Such seems to be the promise of the consumption of petroleum. If all that we hear of the economy and convenience of this material as a fuel be true, there can be little doubt that it will rapidly supersede coal for manufacturing if not for domestic purposes. In such case, a smoke-less London is not an impossibility. Let our photographers not omit to perpetuate some of the effects of picturesque gloom which, during August, 1867, have shrouded the leeward districts of London as if under perpetual thunderclouds. The residents in a smokeless London would find it hard to understand how their predecessors should have supported life in the metropolis as it existed during the dog days of the present year; and no photograph can enable those happy future citizens, if such be about to succeed us, to tell how far the chief necessary of human life, the air we breathe, has been poisoned by the improvident development of commercial activity, and by a gradually accumulated neglect of the prime laws of comfort and of health.

OUR WATER SUPPLY.

Public attention is at this moment turned to the present state and future supply of water to London and the provincial towns of the country; and it is sincerely to be hoped that the inquiry now being conducted will lead to some sound and practical system, founded upon a full and clear elucidation of the subject, exhausting all the skill and science that can be brought to bear upon it, and which have been zealously devoted to it now for a considerable period in the conduct of works, and acting up to the absolute wants and spirit of the age. In aid of that object we tender the following remarks:—

Water is a necessary element of life; in all civilized countries and in all ages it has been the especial object and care of the supreme and ruling authority to secure an abundance of this indispensable and vital element in human, animal, and vegetable economy.

In the palmy days of ancient kingdoms, even the imperial heads of states did not consider it beneath their position or dignity to confer upon their subjects these inestimable blessings; and the funds for carrying out the necessary works of supply were not exacted directly from the people, but flowed freely from imperial resources and princely revenues. With us it has been the prevailing practice to allow all our great works to emanate from the spirit, enterprise, and resources of the people, guided in a slight measure by Government and our Parliament; and thus has sprung up and been satisfactorily established such an extent of roads, canals, railways, waterworks, &c., as no other country can boast of, even in ancient or modern times. Still it must not be supposed, because we have succeeded in carrying out these very extensive and magnificent works,—that all that has been done in designing, laying out, and carrying into effect,—every object has been attained, every want satisfied, every requirement fulfilled, and all that we have now to do is to reap the harvest which the spirit, enterprise, skill, and science of the age have so widely and extensively sown.

But if the antecedents of our water-works speculations come to be closely analysed, it will be found that as many bad speculations and errors have been made in originating and projecting them as now unhappily exist in our railway system, which our great capitalists have found out to their serious cost. A relative of the writer turned his attention at an early period to railways, as an originator and projector of the railway system; in 1821 he obtained an Act of Parliament for a line of railway for general purposes, and from that period he, in conjunction with William James and others, urged upon the public by every means in their power the importance of availing themselves of the great advantages of the railway system. In the year 1830 he published a map of Great Britain, and upon it he laid down a system of railways, such as he thought possible and practicable, from his topographical knowledge of the country, and the requirements of trade and commerce.

This map was urged on the attention of the Government of that day, and also upon the leading men of the aristocracy, the Parliament, and the commercial world; and he suggested that these lines should be surveyed, sanctioned, and adopted by the Government, and carried out by private enterprise, and no other lines be permitted to be made until these the main arteries were completed; as they are now absolutely done, closely resembling the lines he laid down. By the adoption of the plan suggested, all controversy and competition would thus have been avoided, and such costly suits as opposition railway bills would not have been heard of, and our railway system, instead of costing us the unprecedented sum of 500 millions of money, would have cost us only 300 millions, and thus we should have saved 200 millions, the loss of which has ruined and broken the heart of many a hapless shareholder, and added considerably to the cost of railway transit.

The Government evidently afterwards saw the error of their ways, as in the year 1838, when railways were first talked of in Ireland, they directed the country to be thoroughly surveyed, and lines were laid down and adopted by them, and were thus carried out with better success. They saw that if the same system had been carried out in poverty-stricken Ireland as had been adopted in England it would have been attended with ruin and disaster, as Ireland had no surplus wealth to throw away in speculation and unprofitable works. And even now, under this better and more economical system, the Irish lines of railway are not commercially successful, and what would they have been if the foresight and forethought of Government had not adopted a different line of policy to that of Great Britain?

In France the same system of Government initiation and sanction secures, in a measure, the convenience of the public and the commercial success of the undertakings, and nothing is left to chance, competition, or speculation. On the other hand, in the United States the utmost facility is afforded to projectors, reckless speculation is the order of the day, and the result is badly-constructed lines and little or no dividends; the heavy wear and tear of the lines and rolling stock, numberless accidents, and other causes absorb nearly all, if not quite all, the profits in many cases.

This line of argument applies forcibly to the system adopted in carrying out the water-works of many of our towns: they are treated too much, in many instances, as commercial speculations, and but little care or attention is bestowed on the mode of supply, the quality of the water, or the wants and necessities of the inhabitants.

If the necessity is now felt for the state to possess our system of railways, telegraphs, &c., to amend what is wrong and remedy abuses, though how to accomplish the object is at present beyond the scope of our present legislators, how much more necessary is it that every municipality should possess its own system of water-supply, and that no body of capitalists should have power to tax us heavily for this vital and necessary part of our existence. Water should be supplied at the lowest, cheapest rate, just sufficient to cover the expenses of establishing the works, their maintenance, and working expenses, and not that enormous dividends and bonuses should be exacted from an otherwise heavily taxed and burthened people.

To elucidate the position that water-works are not always well executed or attended with success, we could instance Rotherham, Sheffield, and many other places if requisite. In the former place the works were laid out under the power of the Public Health Act (1848); a fine scheme was projected to obtain a supply of water from springs and existing wells, and about 30,000*l.* were expended in constructing elevated service-reservoirs for high-pressure supply, large pumping-engines, an extensive system of mains, &c.; and after all these fine works had been completed, it was discovered there was yet one thing needful to render these large preparations profitable and useful, viz., a supply of water. For years that district has had less than 100,000 gallons of water to supply about 15,000 inhabitants. The magnificent works were looked for first, and that which was to render them useful to the inhabitants was only a secondary consideration. But the spirit of the inhabitants would not be baulked by this bungling engineering, and in 1864 they determined to go to Parliament again, for further powers to obtain an adequate supply from other sources, from gathering grounds in the neighbourhood; and this time the Parliamentary estimate exceeded 26,000*l.* These works are partially carried out, and upwards of 20,000*l.* have been expended of that amount, so that in that suffering and heavily-taxed district their waterworks have already cost about 56,000*l.* (and are still far from complete, requiring impounding reservoirs and other works that will amount to about 20,000*l.* more), for supplying so small a population; and from the limited character of the gathering-ground, and the probable supplies should the population rapidly increase, as it is expected to do, being a manufacturing district, other sources of supply will have to be looked for, at a further heavy outlay.

In this instance the failure was in the municipality; but this arose from their want of discernment and discrimination, in selecting competent and experienced engineering talent to advise and direct them, and which ought not to have been left to their discretion.

Sheffield, also, has been unfortunate and unlucky with reference to her water-supply works. That town is supplied by a company, from water collected from the high moors and land situated about seven miles distant to the west of the town, and collected in reservoirs at Redmires, Crookes, and other places. For many years past grievous complaints have been made of the extreme shortness of water; and their works have been extended from time to time to increase the supply, and to meet the public demands; and even this year a Bill has been passed to increase the supply, and to meet the demand of the inhabitants, and the feeling of opposition created by the disastrous failure of the Bradfield reservoir, and its attendant consequences, which occurred in the year 1864, generally supposed to be from imperfect design and improper workmanship; but, from whatever cause it arose, it is patent to the world that the reservoir works failed, and that, if every proper consideration had been given to its design and construction, the substrata on which it rested, and every subject matter connected with it, the reservoir ought to have been successfully carried out, and not so much as failure dreamed of in their philosophy. At Bradford, Halifax, Dublin, Longdendale, and many other places, reports of failures and defective works have been made public, and these, doubtless it will be said, arose from unforeseen causes and matters beyond the control of the designers and constructors; but if such are the facts, the causes of the failures may be very interesting subjects to engineers to investigate; but the public judge in every case of these works solely by the constructive, commercial, and other success of the undertakings.

We have alluded to the preceding cases as examples of the manner in which the water-supply works of some of our towns have been conducted, and for the purpose of showing that, like the defects of our railway system they have arisen from causes that should have been within the control and supervision of imperial authority and regulations. It is quite as important that the future water-supply works of our population should be matter of consideration and investiga-

tion as much as our mode of travelling from place to place. Even in these railway days everybody does not travel: it is just possible to find people who have never travelled a mile by railway; but it is not possible to find a living soul who could dispense with the use of water, and therefore it is a more general necessity.

It would seem that just as much as it was necessary for Government to select lines, and lay down our system of railways, they should devise and originate schemes for the water supply of the inhabitants, and it might be accomplished in this manner.

Let correct surveys be made of the water-sheds of all our rivers and their tributaries, or outline copies of the Ordnance Survey be obtained from their mouths up to the points whence they take their rise. Let accurate meteorological observations be made on each water-shed, and the rainfall carefully noted, making use of those data which already exist, and where they are trustworthy, but extending them so that they may embrace the whole drainage area of the respective rivers.

On each water-shed let a correct census be taken of the towns, villages, and other populations residing thereon, pointing out their present modes of water-supply, their position, and deficiency, if any. Let the quantities of water necessary to supply them be computed, estimating 20 gallons per head, if not a manufacturing population, and 30 gallons per head if a manufacturing population. Let impounding reservoirs be provided in the best and most suitable localities on every water-shed, to collect the water that falls during the rainy season, taking care to select it at the best moment when it is least affected with filthy matter, or discoloured with floods, and so regulating the supply of the water in the reservoirs, by occasionally letting it off and taking in a new supply, as to keep it fresh and pure at all times; and these impounding reservoirs should be held as a reserve to keep up a continuous supply of water to each district even through the driest seasons known to man.

This system of collecting and storing up water is not new; it is well known to travellers who have visited tropical countries, as there in the rainy season it is the custom to collect and store up the water in reservoirs and tanks sufficient to supply the inhabitants through the period of drought. And these sometimes extend over a great length of time in Central America. We have known it to be six months without a drop of rain, when vegetation becomes sickly, dried, and withered up with the powerful rays of the tropical sun, and it is quite a novelty at those times to see a green leaf or blade of grass.

But to render the water of our rivers and their tributaries proper and useful for the supply of our population, further means must be taken to prevent the inhabitants from pouring their sewage into and polluting them, rendering the water filthy and unwholesome, wasting a valuable fertilizer, and spreading disease and misery along their verdant banks. It is already an offence against the laws for the authorities of towns to do so, and in some instances parties aggrieved have obtained injunctions to prevent it; but, nevertheless, the evil continues to be acted upon and extended, and some more stringent steps should be taken to prevent this crying evil, as a perfect remedy in all cases is open to the inhabitants if they only would avail themselves of it.

These preliminary steps suggested on the part of Government are necessary in consequence of the alleged necessity, or expressed intention, on the part of certain parties to look out for other sources of supply for London, Liverpool, and other places. London, at present, obtains its supply of water from several sources: the Chelsea, Grand Junction, Southwark, and Vauxhall, Lambeth, and West Middlesex, procure their supply from the River Thames and the New River; the East London chiefly from the River Lea; the Kent Company from the River Ravensbourne; the Hampstead Company from artesian wells at Hampstead and Kenwood, and the New River; the Plumstead, Woolwich, and Charlton derive their supply from a well and boring sunk into the chalk above the town of Woolwich. The whole of the water so obtained is filtered (with the slight exception of a small quantity supplied by the New River Company), pumped into elevated reservoirs, and passed by gravitation to the tanks of the consumers. These supplies of water are comparatively modern, as they were carried out under the Metropolis Water Act (1852), and yield, it is said, a supply of 81 millions of gallons daily, which has been obtained at a total cost for works of about 7,161,823*l.*

There are several sources of supply talked of for London,—the Lakes in Cumberland, the source of the River Severn, and other projects, which, doubtless would yield an abundance of good water; but these crude projects require close and rigid investigation, and the fullest and most complete inquiry, by all and every party interested. The estimated cost of the former project is about 8,600,000*l.*, and the latter 12,000,000*l.*, to bring the supply to London; and this cost is, we believe, exclusive of the purchase of the existing works and plant, and exclusive of compensation, and other expenses, that will materially add to the total of the gross estimates.

Liverpool, also, complains of a shortness in the supply of water, although it is not much more than nine years since they constructed large and extensive works at Rivington, about twenty-five miles distant; the rainfall of the district was carefully taken, and, impounding reservoirs made calculated to supply 13 million gallons daily, but this has been found to fall short, producing for many years not much more than 9 million gallons; and this, with the addition of about 6 million gallons from the wells in the red sandstone formation beneath the town, makes a total of about 15 million gallons, while the present wants of the inhabitants exceed 18 million gallons, irrespective of a supply for their future necessities. In consequence, preliminary surveys have been made, with the view of changing their source of supply, and Bala Lake, Ullswater, Haweswater, and other places have been mentioned as the future probable source.

The tendency of modern engineering science is to look out for large and easily acquired sources of supply for such places as London, Liverpool, and similar places. Glasgow is already supplied from Loch Katrine and other lakes; it is brought a distance of thirty-four miles, is 360 ft. above tide-level at Glasgow, and is conveyed through an 8 ft. aqueduct to the service reservoir at Mugdock Castle, 311 ft. above the level of the sea; thence it is carried through two lines of pipes to the city.

Manchester is also supplied from a distant point, some twenty-six miles off. The water is collected in the Longdendale series of reservoirs, Woodhead being the largest and principal, and which may be seen from the line of the Sheffield and Manchester Railway. The water is collected from an extensive gathering-ground, abounding with mosses, and consequently is not the most desirable ground to collect from, nor is the water of the best and purest quality; but reservoir space is found for upwards of 611 million gallons, for the supply of the inhabitants, which is conveyed through aqueducts and pipes, by gravitation, to supply the city.

Bristol has long been supplied from a distance. The water is collected from the Mendip hills, some sixteen miles distant from the city, and is conveyed by means of aqueducts and pipes, by gravitation, for the supply of the inhabitants.

Bradford has been recently supplied from gathering-grounds and springs, some thirty-three miles distant to the north-west of the town, from a district which is particularly interesting and picturesque, and where the Wharfe, Ribble, and other rivers take their rise, its principal reservoirs being Grimwith, Barden Park, Chelker, Silsden, and Heaton, and their total contents of water is about 1,525 million gallons.

We have mentioned these four places to show that it is not without precedent that London and Liverpool should seek a more distant and purer source of supply than they at present possess; but what should be specially guarded against is, that these important, powerful, and wealthy places should not be allowed to secure and monopolise the important sources of supply in the country, and leave numerous and less important places, situated not far distant, "out in the cold," or with a supply inadequate for their present purposes or future necessities.

The district adjoining where it is proposed to take these large volumes of water from to supply distant places, is becoming every year more thickly populated, and it is not unfair to calculate, as population increases, that, at no very remote period, many of those places must necessarily seek these very sources to obtain a supply of water. Besides, it has not yet been shown that the water-shed of the Thames, if properly reserved and economised, is not equal to the requirements of London; and it is probable that recent legislation, *if effectually carried out*, will relieve the river of its many foul impurities. It is calculated that the lowest summer discharge of the Thames is from 300 million gallons to 360 million gallons of water per day,—more than four times the present supply of London; and, of course, the discharge in winter and in rainy seasons is very much greater.

For the sake of illustration, let us observe that the drainage area of the river Thames is generally admitted to be about 3,086 superficial square miles; and if we calculate the rainfall on that area at 24 in. per annum, and allow 66 per cent. for evaporation and absorption (which is an extreme average), we have the enormous quantity of 157,137,429 cubic feet, equal to 982,000,000 gallons of water to be dealt with, and to be rendered available, if necessary, for the supply of the respective towns situated on its drainage area,—more than equal to the supply of the inhabitants of Great Britain and Ireland calculated at thirty gallons a head of the population.

Many of the towns of England, France, Prussia, and the United States are supplied from rivers, and it is generally found that the water is usually softer than that derived from wells, springs, and small streams, and contains a less amount of mineral salts than either of these; at the same time it is commonly more impregnated with organic matter, and this may be accounted for from its flowing over a great variety of geological formations and many different varieties of soil; but this is capable of easy removal by subsidence and filtration.

The system of land drainage now so universally adopted has had the effect of lessening the summer discharges of rivers, and increasing the volume in times of floods, so that flood discharges are much more rapid than formerly, and springs are, therefore, not so copiously fed.

Much controversy has taken place on the supply of water to London from deep wells sunk in the chalk formation; and although there are many wells in and about the neighbourhood of London, Cheshunt, Watford, Southampton, Brighton, and other places yielding a copious supply, it is not certain that it can be obtained in sufficient quantity to supply continuously a large population.

It is a singular fact that although the capacity of the new red sandstone for absorbing and holding water has been much insisted on of late years, in the valley of the Eden, on the western side of Lancashire and Derbyshire, on the eastern side of Durham, Yorkshire, and Nottingham, the midland district south of the great Derbyshire coal field, and in the West of England, how few towns situated in those districts and on that formation have availed themselves of the opportunity of obtaining a supply of water from deep wells; the long and severe contests in Liverpool, Manchester, and Birmingham on that subject have satisfied them that deep and expensive wells are no longer objects to be eagerly sought after and secured, as two of those places have already obtained large supplies of water from extensive gathering grounds situated at a distance from them, and the latter town would probably have done so but for the fact of the numerous private wells that exist in the gravelly and porous strata on which the town stands.

Most of the towns situated in the districts above mentioned are supplied from rivers and from gathering grounds, and but few from wells; the latter include Sunderland, Northalterton (shallow), Nottingham (partially), Liverpool (partially), Wolverhampton, Bridgworth, Coventry, Warwick, and Wells; and out of these there are only two towns, viz., Nottingham and Coventry, that can be said to be satisfactorily supplied by public wells.

Doncaster is now supplied with water from the filthy river Don, notwithstanding the extreme foulness of the river, occasioned by the drainage of Sheffield, Rotherham, and other places being improperly thrown into it; and the authorities of that place have endeavoured for some time past to obtain other sources of supply, and some time ago they commenced to sink an Artesian well, and they carried it to a depth of 900 ft., and incurred an expense of 1,500*l.*, but they failed to obtain a supply of water and they abandoned the attempt.

The conclusion arrived at in Liverpool some years ago by Robert Stephenson, and subsequently by the present engineer, is that it is not desirable to sink additional wells to obtain a further supply of water, but to look out for other sources from lakes, rivers, or gathering grounds at a distance, rather than incur the risk, expense, and uncertainty of obtaining a full

and adequate supply from wells. Since this article was commenced, Liverpool has decided to abandon the new sources of supply at present; and they have determined to construct an additional reservoir at Rivington; to collect the additional supply required. If the cost of London wells is to amount to as much as those of Truman's or Reid & Co.'s brewery (the former cost 4,056*l.*, or 21*l.* per foot, the latter 7,454*l*, or 29*l.* per foot, and the latter yields 227.200 gallons per day), and to produce 81 millions of gallons of water, as now supplied by the companies, it would require about 300 of these wells, and thus at the average cost of those above mentioned, it would amount to 1,726,500*l.*, irrespective of the extensive machinery required at each pumping station, and the complicated character of the work.

But it is by no means certain—indeed, it is extremely problematical—that if this large expense is incurred in sinking wells, anything like that average quantity of water will be obtained, as it has been discovered at Liverpool and other places that the yield over a given area has not been *pro rata* to the number of wells sunk, as one well has been found to drain the area of another, and to lessen considerably the supply of that well; so no correct or definite calculation can be made from the yield of one well as to what others will produce. Indeed, out of seven wells sunk for the supply of Liverpool, five out of the seven yield a decreased quantity, and that decrease was very considerable between the years 1854 and 1865, as appears by the following table:—

	1854, Max. yield in 24 hours. Gallons.	1865, Max. yield in 24 hours. Gallons.
Bootle	1,102,000	643,679
Bush	333,984	—
Soho	669,628	512,204
Botham-street	364,000	300,600
Water-street	578,957	416,218
Windsor	1,028,000	966,316
Green Lane	2,605,812	2,775,942

And the yield from the above wells in 1854 was considerably less than in 1850, and it is, therefore, fair to suppose that that decrease will continue. It is thought that, in the instance of the Windsor and Green Lane wells, the yield is considerably increased by infiltration of water from the river Mersey. It will be inferred from the preceding remarks that we are inclined to the belief that the proper source of supply of water for London is her own fine noble river Thames, by impounding up her surplus waters in suitable and convenient localities, and in sufficient quantities, that would afford an ample supply through all seasons, even the driest known.

Of course care must be taken to perfectly purify and filter the water, and this it is possible to do, by putting in force the powers of the new Bill, so that all sewage and filthy drainage water may be religiously excluded, and by the construction of large impounding reservoirs, that would also serve for the purpose of subsidence and purification.

And while on the subject of reservoirs, it would be desirable that some better and more substantial system should be adopted than in the construction of some modern works. If a system of impounding reservoirs is to be carried out generally in the country so as to preserve a regular and continuous supply of water in all seasons, it becomes a matter of serious consideration so to design and construct them that they shall become permanent and substantial works, as is so well exemplified in the works of our old canal engineers. In their days there is no record of such disastrous failures as those that have occurred at Bradfield or Holmfirth, nor the lesser defects of those at Longdendale, Roundwood (Dublin), Halifax, Bradford, and some other places.

The great fault in the construction of the former works arose from the tops of the embankments being too narrow (Bradfield is only 12 ft. wide; Holmfirth, 16 ft.); and therefore the banks are too light to resist the weight of water, the inner and outer slopes of insufficient angle, the earth of which they are composed being of an improper character, loosely, badly, and hurriedly put together, not carried up in thin lifts or layers, and one lift being thoroughly punned and consolidated before another is laid on.

In the case of Bradfield the embankment was carried up by means of tramways and earth-wagons in lifts of many feet in thickness, and before the bank had become consolidated the water was turned in, and resulted in that terrible catastrophe. The core or puddle wall was not of good substantial tenacious clay in the centre of the bank, or carried up sufficiently high above top-water level. The inner face of the bank should have been faced with a strong apron of puddle, and protected from the wash and abrasion of the water by a durable stone pitching. The face of the outer slope to be soiled down and sown with grass seeds, or the turf that is stripped off the base of the embankment may be used for the purpose of securing a green sward, as a protection to the face of the slope. Many of the reservoirs that are now used for the supply of our canals are now approaching closely upon half a century old, and yet they stand enduring and lasting monuments of man's handyworks; and we see no reason why modern works should not be similarly constructed, if only the same painstaking and labour were bestowed upon them as was the prevailing practice of our forefathers.

Economy now appears to be the order of the day; but it is false economy to construct works carelessly and inefficiently, merely to save a little in the space of time or a few pounds in the first cost, as works like these are generally found the least expensive in the end that are well and substantially executed, regardless of time or expense. According to modern practice there seems to be no given rule for the construction of reservoir embankments. At Longdendale the compensation reservoir bank is 27 ft. wide at top, the inside slope 3 to 1, outer side 2 to 1, and 90 ft. deep (the Crowden reservoir, by the same engineer, is only 15 ft. wide at top with similar slopes), while the Bradfield reservoir was only 12 ft. wide at top, with inner slopes 2½ to 1, outer ones 1½ to 1 (as I found them), and 95 ft. deep. The Round Wood reservoir, near Dublin, has a 30 ft. width of top bank with a depth of 60 ft., while the Holmfirth reservoir was only 16 ft. wide at top, inner slopes 3 to 1, outer 2 to 1, and with a depth of 96 ft. At Oldham the Python reservoir has a width of top bank of 30 ft., with a depth of 60 ft. of water, while a reservoir which failed at Over Darwen had a width of top bank of only 8 ft.

Most of the reservoirs were designed and carried into effect by eminent engineers, and yet the practice so widely differs as to be quite incomprehensible; either the larger dimensions are too strong, or the smaller ones ridiculously weak: it is evident "there is something rotten in the state of Denmark," and this must be patent to the most casual observer.

We do not find these defects and errors of design amongst the works of our Telfords, Walkers, Rennies, and other worthies. Telford's usual practice was to proportion the top width of his embankments to be equal to two-fifths of the depth, with inner slopes 3 to 1, outer slopes 2 to 1, and many of these works have withstood the invaluable test of time, and are more than half a century old. Molesworth, in his Tables on Reservoir Dams, gives the top width of *high* dams at from 7 ft. to 20 ft., without particularly specifying a definite width for height of embankment, although it is important and absolutely necessary there should be a sufficient body and strength of embankment to resist the weight of water pressing against it, as the pressure of water is as the square of the depth, therefore the resistance should be in a similar ratio.

The inner slopes he recommends should be 3 to 1, and the outer ones 2 to 1, the generally admitted proportions for slopes.

It may not be considered out of place here to allude to the modern fittings of water supply; and although we would advocate the system of high-pressure supply for the waterworks of towns, it leads to a very considerable loss and leakage of water, without great care. Of course the pressure being always on the pipes, they are all put to a very severe strain in every part, and leakages frequently occur, that have been going on probably for some time until it attains sufficient volume and force as to break up the surfaces, and when it does so, it carries everything before it, as was evidenced in Liverpool a short time ago, and in some other places. There is also a considerable leakage at the taps, which not even the use of the "screw-down tap" effectually prevents.

There is something more required to preserve the water, and to prevent it being wasted, than the mere screw-down tap. Probably each house should be supplied with a "stop-tap" also, so that there may be a double check on the escape and waste of water. The stop-tap might be fixed within the premises, and in a position easily accessible to the inmates. Stop-taps are generally fixed on the service-pipes outside the premises and in the street, so that the water may be shut off at any time, and to facilitate repairs; but that is of no service at any other time, and does not aid at all to prevent waste or the escape of water.

These remarks have been extended to a greater length than was intended, but it is a subject of national importance, and needs full and ample discussion.

LOSS OF THE CATHEDRAL AT FRANKFORT.

All those who take an interest in the memorials of former times or delight in the glorious monuments which the Middle Ages have left us, will have heard with grief the news of the destruction of the cathedral at Frankfort-on-the-Main. The fire which destroyed this noble church must be looked upon by Germany as a national calamity, as this cathedral was the electoral church of the German empire. It may not be uninteresting to our readers to give a short historical sketch and a description of the late cathedral. The first notice we have of a church on this site dates back as early as the year 874. In the year 882 this building is referred to as "the Chapel of St. Saviour." This chapel was rebuilt in the year 1239, but of this second structure there are probably no remains, as the church was again rebuilt on a much larger scale in the fourteenth century, and the building then erected formed the late cathedral. The foundations of the church were laid in the year 1315, under Louis the Bavarian. The choir was completed and used for mass in 1338. The nave and aisles were completed in 1352, and the vaultings in 1410. The great glory of the cathedral, the noble western tower, was begun in the year 1415, and carried on until the year 1512. The architect of this noble work was Madern Gertner. The church when completed was dedicated to St. Bartholomew.

The plan of Frankfort Cathedral is a very singular one. It consists of a choir of great length, a very short nave (only three compartments long), aisles, and immense transepts, each of five bays. Each transept is considerably longer than the nave. The nave and choir are also much lower than the transepts, so that it is difficult at first to realize the fact that the church was not built north and south, and that the two large transepts are not a great nave and choir. There is a tower nearly 40 ft. square at the west end, and over 300 ft. in height. Leading from the transepts are chapels. The whole church is vaulted. The choir contained a fine set of stalls, with frescoes by Stephen, of Cologne, adorning the wall-spaces below the windows. These paintings were executed in 1427. In the south transept was a statue of the Madonna, with a splendid lofty stone canopy. In two of the chapels leading out of the transepts were fine old stone altars, with canopied reredoses. In the north transept was the remarkably fine monument of John Holzhasen, 1371. A new pulpit of good design and an organ had been recently erected. The beautiful tower was of a very similar design to that of Freiberg, except that it was crowned with a dome instead of a spire. The lower part of the tower is square, with noble buttresses; the upper portion is octagon. The corner spaces or *broches* were carried up with noble groups of pinnacles to the full height of the octagon. The whole had been recently restored. It is quite impossible to say yet what injury this noble edifice has sustained; but it is much feared that little or none of it will be in a sufficiently sound condition to remain standing, particularly the tower, which has suffered very much from the quantity of wood used in the construction of the belfry floors. The bells fell through the vaulting under the tower, and smashed the organ, setting fire to the interior of the church. Until the building can be carefully examined by an experienced architect the real damage cannot be estimated. We understand the cathedral is heavily insured, and we feel that the Frankforters will use every exertion in their power to restore, or, if necessary, rebuild this, the greatest ornament and most interesting building of their celebrated city.

To Loosen a Rusty Screw.—If you have a screw rusted into wood, or a nut or bolt that will not readily turn, pour on a little kerosene and let it remain. In a little while it will penetrate the interstices, so that the screw may be easily started.

SKETCHES IN ANNANDALE.*

The district of country which lies to the north-west of Carlisle in the conterminous counties of Cumberland and Dumfries is possessed of a certain curious, weird, historical interest which is peculiar to itself. After crossing the splendid viaduct which bridges the river Esk, we get into the very centre of that celebrated debateable land which is sacred to the memory of the Moss-trooper, where we are beset on all hands with traditionary lore of Border feuds, tales of adventure, and records of battle-fields. The times are somewhat changed—some will say degenerated—since Kinmount Willie and Will o' Delorraine used to ride on the opposing shores! The Lords Wardens of the neighbouring marches sleep with their fathers; and the Howards and Percies have long abandoned their hereditary feuds with the Maxwells and the Douglasses. The general features of the country are indeed unchanged. We have still the distant Cheviots and the Northumberland fells. The stately forehead of Skiddaw still reposes in wreaths of vapoury clouds: and the distant peak of Criffel may still be seen keeping solemn watch and ward over the estuary where Solway tides roll in their rapid and impetuous career. It is only when we come to observe the improved agriculture of the district, the farm-houses dotted here and there, the nicely situated gentlemen's seats, the pleasant villages, and the peaceable aspect of the people that we can form an estimate of the social improvement which the security of Government and the fruits of peaceful industry have wrought since the union of the two countries. Even yet the old feudal fortresses, as we have seen, are still conspicuous objects in the landscape; and many a romantic and secluded dell is yet rich with the ruins of the ancient abbeys, whose monks derived a splendid revenue from the illegal spoils of their ferocious neighbours. The vesper-bell is now silent; the feudal castles are tenantless; the Moss-troopers' descendants are sheep-farmers; and the mosses themselves are in process of being reclaimed. Yet we must not suppose that such vital and organic changes in the Border society were suddenly brought about, or that this progress was the work of a generation or even of a century.

The vivid and most accurate description which M. Thierry † has drawn of the manners and customs of the population, or what is more properly translated *the peoples*, of this Border debateable land at the time of the Norman invasion still characterised it long after the blessings of peace had spread over the country; and indeed very strong traces of their lawlessness and insubordination may easily be found at the present day. For those who under the film of a somewhat enforced and artificial civilization choose to penetrate the crust of outward appearances may still observe that the force of habit as to the disregard of property law has by no means died out. Even yet it sometimes holds—as Wordsworth sings—

> "The simple rule, the good old plan,
> That he should take who has the power,
> And he should keep who can."

The Border population surrounding the Solway is, in fact, still largely composed of people half gipsy, part smuggler, part poacher, who are not at all enchanted with the rules of peaceable and orderly society; not given to marriage, for example, nor sobriety; and above all, most wofully deficient in the exercises of religion. Whoever chooses to read the account which the poor parish-minister of Gretna once gave of his wayward and backsliding flock ‡ will not, in all probability, seek for other proofs or illustrations. Indeed, the offices of a parish clergyman are very much at a discount in that quarter of the country; and notwithstanding it sometimes happens—where the Church of Scotland, or any or all of its formidable troop of dissenters, fail to evangelise a poor and lawless district—that the Roman Catholic priest has met with signal success, even he has totally failed in the debateable land; and in fact there is neither chapel nor priest to be found in the neighbourhood. The poor Scoto-Irish of Maxwelltown and Dumfries have their spiritual wants amply supplied, but the missionaries of the Roman Catholic church have not yet reached eastward further than Annan. We mention this as a curious circumstance which may partly account for a social phenomenon which for many years has puzzled our legislators and played a conspicuous part in the marriage-customs of England. There can be no doubt, we think, that it was from this lax and irreligious condition of the people that those habitually irregular marriages sprang which ultimately concentred at Gretna Green and has made that obscure village immortal,—customs which the law of Scotland still tolerates, and which have only, thanks to Lord Brougham, been recently declared illegal by the Engish Legislature.

From these causes, also, seem to have sprung the circumstances which made Bewcastle, Rockcliffe, and that neighbourhood the head-quarters of the gipsies. This is a fascinating subject; but we must not dwell here on the curious details of gipsy life. The whole subject has recently been investigated with much skill and learning by Mr. Simson,* who seems to have established to his own satisfaction that many noble families in Scotland have gipsy blood in their veins! It is a wonder, by the way, in these days of ethnological analysis, that no such candid inquirer has taken Burns for a gipsy. His swart complexion,—

> *"The vellum of the pedigree they claim,"—*

his raven locks, his brilliant black eyes, together with his stooping though muscular shoulders, gave all the requisite physical signs, as we are expected to believe. And then the erratic and undisciplined character of his genius! Shade of the illustrious Blumenbach, how many theories of race could be half as well established? How many Aryan mysteries could be so simplified and solved? We only hope that any future writer who pursues the subject will not forget to remember, as the fashion is, that we had thrown out such a hint. There might, perhaps, be certain geographical difficulties in connecting him with the gipsy tribes of the Solway; but what of that? are they not merely branches of one great trunk—lineal descendants of one great family? *Quod erat demonstrandum.* We need say no more. The well-known Act of Geo. III., which brought the poor gipsies under the penalties of the law by designating them rogues and vagabonds, made sad work, under the vigorous administration of the squirearchy and the justices of the peace, with their villages and cantonments; but even yet the pedestrian who is fond of prowling into unexplored nooks of the Border country, will meet perchance with an aged sybil who can trace the pedigree and the locality of her tribe for 200 years.

To the gipsies succeeded, in the natural order of things, a community of smugglers, who have only of late years become extinct. It is very remarkable how little information we possess respecting the Solway smugglers; indeed, what we do know seems to be altogether derived from the pages of fiction: their adventures are chiefly enshrined in the themes of forgotten ballads. There can be no question, however, but up to a very recent period—probably to the very date of the equalization of the spirit duties between England and Scotland—that this desperate profession did, in fact, engross the attention of a very large section of the population. Their plan of operation was simple enough and well understood. The Isle of Man was the great depôt for the kegs of brandy, kilderkins of hollands, runlets of old Jamaica, bales of Virginia tobacco, parcels of Valenciennes lace, and other wet and dry commodities, which the British Legislature in its wisdom, thought fit to lay under the embargo of heavy duties. The whole secret, therefore, of the Solway smuggling was to transport these goods from the island by means of a swift sailing-lugger,—that is to say, a small vessel carrying three masts, with a running bowsprit and lug sails,—to any of the numerous ports, or rather landing-places on either side of the shore. A party of people were always ready to receive the vessel on a preconcerted signal, which invariably returned by the same tide. Sometimes, in cases of extreme danger, the cargo was hid in pits dug in the sandy beach; but, generally the spreading shadows of the night favoured the debarkation, and the bales and casks were speedily landed, slung on the backs of horses and "run" over the adjacent country. Such a traffic — illegal, immoral, and in the highest degree dangerous—was, nevertheless, lucrative; and many loyal and unsuspected traders had, it was quietly understood, a share in its profits. Traces of its wide-spread influence may still be found, if cautiously sought for; and among these we may venture to point out—of course with all manner of charity—the large amount of *cellarage* and storage that one may see in such places as Bowness and Skinburness, as well as Port Annan and Ruthwell. Indeed, the cellars in the little towns of the Solway are quite a curiosity in their way: there is not an obscure village baker's, butcher's, or even shoemaker's shop that is not supplied with a capacious cellar as large as that of a London gin-shop in Oxford-street, or an ironmonger's store in Upper Thames-street. Such cellars for the most part have large and substantially-built openings, 6 ft. by 4 ft., at the very least, and are usually supplied with stout double-folding timber hatchways hinged on the sides, and opening outwards. There are iron stanchions and gratings across the daylight openings, stout gangways and gantrices, iron rings batted into kerbstone; in short, all the facilities for getting in and out a puncheon or a hogshead with the utmost secrecy and despatch. We had the curiosity to inquire of an old inhabitant of Annan, the meaning of this extensive range of cellars, which seemed, we said, to be as much part and parcel of the plan of the houses in that royal burgh as a kitchen area in an ordinary house in London or Edinburgh. We were told very quietly in reply that Annan had once possessed a *considerable wine trade!* Upon another occasion, while walking on the sands near Dornock, we got into conversation with an old sailor, one of those curious lounging amphibious animals, half fisherman, half smuggler, and whole poacher, who seem to be indigenous to the Solway. He was, we found, as well acquainted with the Cumberland as with the Dumfriesshire coast; and could point out to our great astonishment every cove or headland in the bay, where a lugger might be run in with safety, and a cargo bumped ashore. "I have been on the top of that mountain, sir," he said, pointing to Skiddaw, on the opposite coast, over which a curious atmospheric effect was at that moment visible. "Indeed," we replied; "in search of the picturesque?" "No." "Shooting partridges?" "No." "Studying the rocks?" "No." "What, then?" "Well, sir," he replied, with a most knowing squint, "*I was showing a red light!*" It is possible the old salt might be tampering with our credulity; for unless on a very clear frosty night it would require an immense stretch of imagination to suppose a solitary signal of that nature useful at so great a distance. But, on the other hand, it is undoubtedly within the range of possibility; the story is, at any rate, a good one, and so we have written it down. We will only add respecting the smugglers, that the ancient spirit is still kept up, it is reported—but we must own, as far as we are concerned, without a jot or tittle of evidence—by the practice of illicit distillation. On this subject, and with the recent New York revelations before us, we can only observe that the present high duties on Scotch whisky—notwithstanding all the vigilance of the inland revenue officers—is sufficient to tempt certain classes of the people into secret crime. This is an abstract question, which has very nice limits, and is of course beyond our province to discuss; but it does seem odd, we must confess, that this commodity alone, of all our national products, should be taxed at the rate of 500 per cent.! If, as it is sometimes supposed, the high duties promoted temperance, then we might safely affirm that the legislative wisdom of Mr. Gladstone had reconciled one of the greatest paradoxes in taxation, to wit: by the levying of high duties he had also improved the public morality. But, unfortunately, it turns out that the Scotch people consume as much of the dear whisky as they did when it was cheap. There is plenty of evidence with regard to the poachers, but we need only refer our readers on this point to the district returns of crime. The Solway poachers,—of whom there are two sorts,—land rats and water-rats,—seem to suffer great temptation under the laws which preserve the grouse till August, and from the Acts which constitute an annual close time for the salmon, that is, from August till February. The close time, indeed, seems to exercise a most pernicious influence on the character of the Solway fishermen, who are every year pulled up and fined or imprisoned for divers intricate and very often ill-defined breaches of the Salmon Fisheries Acts. The fishermen complain bitterly,—and, as it seems to us, not without reason,—of the great injustice done them by these recent Acts of Parliament; and, in nothing more than this, that they are uniformly tried before the local justices, who are chiefly

* See p. 563, *ante*.
† *Vide* "History of the Norman Conquest."
‡ See Statistical Account of Scotland.

* History of the Gipsies. London: S. Low. 1865.

upper proprietors in the neighbouring rivers, and, consequently, their mortal enemies.

The Solway fishermen, we ought to explain, are divisible into three classes at least. In the first place, there are the regular lessees of the salmon fisheries,—men of considerable capital,—who fish the Solway by means of the stake-nets, that give so much offence to riparian owners. These are the sort of persons to whom Billingsgate is chiefly indebted for its regular supply of the finest fish. In the second place, there is a class of small farmers, who are known in the district as "Pendiclers," from the circumstance, we presume, of their farms consisting generally of small pendicles of land abutting on the shore. These men have usually the right of Solway fishing *exadverso* of their lands, as a condition of their lease; and between the two farms,—the sea and the land,—it is said that they manage to pay a tolerable rent. One curious fact concerning these "Pendiclers" is worth stating. It is said they can only afford to keep one horse; consequently, when about to plough, each has to borrow another horse of his neighbour.

There is a sect of foreign invaders, we should mention, who have within the last few years sprung into existence in the "trawlers," who come from Morecambe Bay in Lancashire, and who are supposed to confine their operations to the capture of shrimps and cockles. Such interlopers do not come within our category; but we may mention that these travelling gentlemen, under the colourable pretext of dredging for those molluscs we have just named, have of late years contrived to do a good deal of illegal fishing for salmon.

The third and last real division of the Solway fishermen is that numerous class who fish for everything that comes to the net,—for the most part according to law, but not unfrequently according to conscience,—a quality of the Solway mind which, we need scarcely add, possesses great flexibility and powers of digestion. There is an old saw current on the Solway to this effect,—that the conscience of a fisherman is like the stomach of a fish; and we may add another which belongs to the Channel Islands, which is, however, better expressed in the Guernsey patois,—they are like the fish they catch: they walk backwards! To this law, if it be one, the fisher folk of the Solway form no exception; for, like most fishermen, they strive to keep as much behind the age as the agricultural and manufacturing population do to keep abreast of it! The ingenious author of the "Origin of Species" ought, we think, to give a glance at the unprogressive character of these people before committing himself to a theory of transmutation. No doubt much may be said for their want of education, and so forth; but we ought to consider, at the same time, that no possible form of scholastic training could teach them better than their own instincts and experience to catch fish! The bad effect of an irregular calling also tells on them,—the interruption by storms and floods, Acts of Parliament, and, what is worse than all, the scarcity of fish. Besides, it should always be remembered that they suffer more than other handicraftsmen by exposure to the weather and all its attendant evils; and, finally, they run a risk more or less constant of eventually finding a watery grave.

It is curious to trace the influence which centuries of English companionship has exercised here; for unquestionably there is a strong tincture of the same civilization on opposite banks. The very names of places, a sure symptom of kindred races, are often identical. There is a hill, for example, called Saddleback in the neighbourhood of Derwentwater: there is a hamlet of the same name in Moffatdale. There is a Wigton in Cumberland and one in Galloway. There are two villages called Bride Kirk in the opposite counties, and there are likewise a couple of Daltons. Torthorwald, in Annandale, is pure Saxon; Murray Thwaite is an importation from the Lakes; and Lanrig, Mealrig, Longtown, West Newton, and such like names in Cumberland, have numerous correlatives in the south of Scotland. It is also very remarkable that both English and Scottish districts have their share of Irish immigrants with all their Milesian influences; and it is curious in both cases that these colonies are chiefly confined to the western coasts.

Similar analogies might be drawn from the dialects of the common people. The term "statesman" for landed proprietor is often used on both sides of the Solway. "Ca thee ca me" is a proverb indigenous to both districts; and we may easily detect by a little attention,—amidst the profusion of rough and guttural expletives which adorn that horrid drawling, snivelling patois which is distinguished by Prince Jerome Bonaparte into Low Country Scotch,—that peculiar broad, open pronunciation of the "a" "o" and "u" which is peculiar to the vernacular language of Cumberland; which is, we are told by philologists, to be clearly assigned to a Danish origin, and which constitutes, indeed, nearly all the vocal traces that we have left in these islands of a Scandinavian supremacy.

These analogies of course indicate plainly an early and continuous intermixture of the different races. The population which has lined the shores of the Solway seem to have migrated indiscriminately from time immemorial, from the south to the north, and from the north to the south. It is a singular fact, but it is nevertheless true, and all good observers come to the same conclusion, that there are more Cumberland people in Dumfriesshire and Galloway than there are Dumfriesshire and Galloway people in Cumberland. Does not this fact rather tell against the universality of Dr. Johnson's maxim,—that a Scotsman's best prospect was the high road to England? But in whatever light we may view it, there can be no doubt of the intermixture and the consequent identity of the popular manners and customs. The food is the same,—not so much oatmeal and milk, as bread, bacon, and beer. The dress is the same, only that is not so much to be wondered at in the era of Moses & Son. But the fashion of wearing clogs, for instance, in place of shoes or boots, which is universal among the peasantry of the north of England, is also common to the south of Scotland, and these are worn by all ages and both sexes. This, we partly suspect, is a necessity of the rough pavements of the district; for such towns as are situated at the mouths of the rivers are usually paved with the small round, hard, and water-worn boulders derived from the bed of the neighbouring stream. To walk over a pavement so constructed is not unlike the ancient penance inflicted by the Church of Rome, on certain holy pilgrims, of walking to the shrine of Lorretto with pebbles in their shoes!

Again, a market day in Cumberland and one in Dumfriesshire are so entirely similar in their manifestations, that it would puzzle the keenest observer to detect the difference. There is the same curious exhibition of caravans, steam horses, raree shows, wax works, giants, equestrians, clowns, and wild animals at the half-yearly fairs; the hiring markets are also characterized by the same stupid, antiquated, and pernicious fashion of the ploughmen and farm-girls exhibiting themselves like lower animals, and showing their points to the farmers like the slaves in the market of Constantinople! Other circumstances there are which flow from these hiring fairs in which the two countries have, unfortunately, a common experience; but on this sickening subject we will not dwell.

A much more gratifying *point de resemblance* may be found in the gymnastic games which are common to both sides of the border; and it is curious that Dumfriesshire, in the matter of fox hunting and horse racing, is almost entitled to the character of an English Midland county. For example, the Annan race meeting which, after a lapse of ten years, was revived in 1865, and which has risen since that time from comparative insignificance into something like respectability, came off the other day on the usual course on the sands of the Solway. There was a very large attendance of sporting gentlemen, and the course was crowded by less interested spectators. The Marquis and Marchioness of Queensberry graced the meeting with their presence, and took great interest in the proceedings of the day, the marquis riding the winner in the Hurdle Race, and his own horse in a match with Mr. Lindsay.

Undoubtedly, however, the greatest elements of similarity are perceptible in the striking resemblance of the architecture. We do not speak so much of the churches and other public buildings,—although even here, to give an illustration, the town-house of Keswick and that of Annan possess a distinct and well-marked consanguinity; horrible gaol-looking buildings both of them!—as we do of the villas, farm-steadings, and cottages. It was, we confess, new to our eyes; but with much pleasure did we trace in the south of Scotland a few of those features which are inseparably associated with our old English village architecture. Here is a villa perched on the side of a sloping hill, with neat triangular roof, dormers, oriel windows, bargeboards, finials, and tasteful dressings, such as we see any day in the neighbourhood of Carlisle or Durham. There we may see a modern farm-town, as they are called; in other words, a decently-constructed steading, with proper and convenient offices, showing some traces of design and fitness of purpose. Of course, the strong similarity of the building materials add to the effect. In street architecture, the principal houses of a town such as Annan or Lockerbie are built of the beautiful red sandstone of the district,—a continuation, the geologists say, of the Permian system of Cumberland,—which admits of every variety of treatment; but there is also abundance of brick,—sometimes particoloured,—plenty of compo, plastered fronts, and painted imitations of freestone; together with Welsh slates,—dark blue and dark green,—often tastefully intercoursed on the roofs; and finally, a profusion of different patterns of terra-cotta ornaments, ornamental red tiles, and stoneware chimneys.

One sometimes wonders where all the curious old-fashioned designs in those ornamental articles are disposed of. The mystery is solved at once by the study of the sky-lines of a Border town. One very curious point of resemblance we observed in the chimney-pots, which are often composed of four mitred slates connected with copper wire; pots which prevail all over the Cumberland lake district, where slates are abundant, and are here imported into Annandale where no such materials exist! Speaking of chimneys, we may notice the very picturesque feature which is incidentally obtained by constructing the stalks of a chimney separately and diagonally on the plan—an arrangement we observed in this quarter for the first time in Scotland.

One or two important lessons may be gained by studying the respective qualities of the opposite counties with regard to the question of site. We need not enter on the nature of the climate; but in the selection of a site for villas, for example, two or three considerations occur. If we examine the slopes of the Solway basin on the Cumberland coast, we shall find that it wears a darker hue as it ascends from the shore to the heights of the Skiddaw. Slanting downwards from the sun it has a much darker shade than the opposite slopes of Scotland, which face the sun, and are consequently in possession of the southern exposure. The difference, therefore, of the climate of the north of England and the south of Scotland is in favour of the latter. But, on the other hand, the northern coast is more exposed to the ravages of the south-west wind, which during certain seasons blows uncommonly fierce and strong, from which the southern coast is protected by the Cumberland mountains. It ought to be remembered, therefore, in planning a house north of the Solway, that the ordinary law of southern exposure ought to be modified; and that it might turn out a happy accident if the proprietor got a hill or a forest between his prospect and the "Atlantic sou'-wester."

With respect to the general plan of houses, the English form is everywhere visible. There are no *flats* on the Solway. Even in the neighbourhood of Dumfries, although there are numerous specimens of the antiquated and barbarous pent-roofs, there are few of the Edinburgh and Glasgow tenements and common stairs. As to construction, we may state that the mason-work is generally very good. Some houses, near Annan, we examined, that were being built by Mr. Hugh Ker, were quite of a superior execution. The joiner-work is not so deserving of praise; but this is not to be wondered at in a country district. A curious fashion seems to have prevailed in the slater-work, of commencing at the eaves with slates probably 2½ ft. by 2 ft., gradually diminished in the upper courses, and finishing at the ridge with slates 9 in. by 6 in. The plumber-work is not very far advanced. But the compo is carried to a pitch of imitation that almost deserves the name of high art; and we are of opinion that the craft of plasterer exists here in a very high state of perfection, or, at least, of development. For example, we shall see in any small country town, houses of precisely similar plan and elevation, much diversified in their external coating: one is plastered and painted imitation free-stone—a darker and lighter shade of raw sienna alternating all too regularly on the wall-courses; another is done to represent a slate-coloured whin-stone,—very small blocks, very well cubed, and exquisitely pointed; while a third gives a glaring neutral tint of real sand-stone irregular rubble, with contrasts of colour in cornice,

lintels, quoins, and string-courses, which, on the principle that good wine needs no bush, seems much less carefully constructed than its artificial neighbours. To conclude this subject, we may suppose the painters not to be so plentiful, or that paint on the northern shore was very scarce. Some doors and windows we observed in Annan appeared as if they had not been painted these twenty years.

The cottages on the Solway are, upon the whole, favourable enough specimens, very superior indeed to what we have seen in other parts of Scotland. The worst are those rude, ill-built, and diminutive hovels, with barely any light, and scarcely any room to stand upright in, which we may see clustered around any fishing station. The best are those on improved estates, such as that of Lord Mansfield. The late General Dirom gave a prodigious impulse to the improvement of cottages, in the carrying out and building of the village of Brydekirk, so far back as the beginning of the century; and although these little houses are now antiquated and too small, still they are capable of being clean and well aired. Even before his day there seems to have been a spirit of improvement abroad. We observed on the road to Ecclefechan, a group of cottages bearing the date of 1766, substantially built of sandstone, and slated, with sashed windows, ceilings 8 ft. in height, and decent-sized rooms of the ordinary "but-and-ben" plan. This was, we confess, a surprise to us. It was not so good to see one of them that had been built in 1866—a century afterwards—of the very same plan, mould, type, variety, and form! The very dimensions of the small windows had been slavishly copied. Surely there was an utter absence of the spirit of progress here. One gratifying fact we may record; the cottagers generally seem to cultivate a taste for flowers, which may be due, perhaps, to the circumstance that Annandale is celebrated for its gardens and for its horticultural trade. But there are other manifestations which lead us to believe that the love of art is innate in the poorest classes of people. The pavement we have mentioned is generally composed of smooth water-worn boulders,—or chuckie stones, as they are termed in Scotland,—and we need not say that a river which takes its rise in a granitic rock, and drains a district of red sandstone, superimposed upon clay slate, and lined over its banks with glacial *débris* and conglomerates,—that such a river will produce a very great diversity of boulders, in form, composition, and colour. In fact, a proper selection can at any time supply all the positive colours, most of the intermediate combinations, and many of the most brilliant shades. With these materials, then, the inhabitants of Annandale construct their pavements, after the manner of mosaic work or parquetrie; in fact, they make a rude sort of tesselated pavement, mostly of regular geometrical designs, such as a rhomboid enclosed in a parallelogram. But this is not all. There is a fashion among the peasantry, and also the servant-girls, with regard to door-steps which would greatly delight Mr. Henry Cole, or any art-master of Kensington who dreams about popular intuitions in our schools of art. The steps are usually constructed of red sandstone; but, at all events, in cleaning the steps a piece of very deep red sandstone—keel, in fact—is commonly employed. This constitutes the groundwork of the picture, over which a series of graceful curves, after the manner of engine-turning, are produced with a piece of white pipe-clay! The effect is then heightened by touching off with white the corners of the steps, which, from long rubbing, become regularly chamfered, and seem as if they had been so constructed as to afford a ground for the belt of colour.

Hitherto we have pointed out, as far as we can, the *similarity* which exists, under certain circumstances, between the two populations on the opposite shores of the Solway; and we should now, like good artists, proceed to describe the *difference*—to reverse the picture, so to speak: put in some shadows, and throw some light on the background, but our space is exhausted.

The Paris Exhibition Building.—The *Nord* says the Exhibition building will not be pulled down as soon as the Exhibition is over, but will be used for an international bazaar, in which the productions of all parts of the world will be offered for sale. A canal is to be made between the Seine and the Champ de Mars, so as to place the building in direct communication with the river.

THE YORKSHIRE MEMORIAL OF THE LATE LORD CARLISLE.

We may add to our previous memorandum that the site selected for this monument is Bulmer Hill, not far from Spittle Beck. It is so placed that when the proposed alterations are completely effected, it will stand in the centre of a magnificent avenue of trees, extending from the top of Slingsby Hill down to Barton Hill Railway Station, and having in a line with it the arch of the Crow's Nest Inn, Castle Howard, and the Marlborough obelisk. The column will spring from a square platform, about 13 ft. high, having pyramidal supports, and approached on the Castle Howard side by a flight of steps. The height of the platform and column will be about 120 ft., and the hill on which it stands may be taken as from 350 ft. to 400 ft. above the level of the sea. An ornamented capital will crown the column, and the column itself, in addition to a pendant scroll of flowers on either side, will be fluted to a depth of 6 ft. or 7 ft. on the upper part of the shaft. Surmounting the column will be an iron tripod supporting a mass of flame. The monument will be constructed of Bolton Cragg moor stone. Mr. John Chick (agent to Sir E. A. E. Lechmere, Bart.), of Whitwell, has undertaken to superintend the works. The contractors are Messrs. G. Bailey & Son, of York.

MURRAY'S SCOTLAND.*

When Mr. John Murray chooses to present the world with a Handbook, it should be received in the light that we accept a Russian bond from Rothschild. The subject may be open to doubt in a variety of ways; but the doubt can in no way apply to the banker. Mr. Murray is the colossus of guide-book publishers; and it is hardly necessary to observe that in such a business experience is worth its weight in gold. There can be no doubt, for example, that the method which has been so successfully employed in conducting thousands of bewildered travellers over the Alps or up the Rhine would be at least as serviceable in the Scottish Highlands or the Hebrides; and accordingly Mr. Murray's title to be heard—to pursue, as our Scotch legal friends would say—on the subject of Scotland is beyond all question. How he may have conducted his case is a different affair, and, in fact, we must confess that we looked for this handbook of Scotland with some anxiety, and we will explain why.

Scotland, although it has now been for more than a century and a half an integral portion of the British empire, is, nevertheless, in many respects, less known and understood by the mass of Englishmen than any country on the Continent taken at random. Its whole system of jurisprudence differs from ours; and to that curious extent that at this moment England in the eye of Scottish law is a foreign country! Let us ask any average man on this side of the Tweed what he knows about the Scotch marriage laws, for example, or the tenure of land, or that complicated legal process which is called a multiplepoinding, or an action of declarator and putting to silence, or a warrant in *meditatione fugæ?* You might as easily get authentic information about the political state of Patagonia or the climate of Kamschatka! Again, the Scottish theology is so very peculiar—partaking, to a much greater extent than most people would suppose, of the ancient Jewish economy, or, rather, of the dogmas and doctrines of the Pharisees. With all this pretension to superior sanctity, the statistical returns of the Registrar-General show an amount of absolute immorality which is not surpassed by any country of Europe. Alas!—

> Not all the blood of beasts
> On Jewish altars slain—

can wipe out this sad blot on the national escutcheon. We will say nothing about the consumption of whisky, nor of certain other little profanities, of which the Jedburgh people found themselves guilty the other day. We have said enough to show what, however, requires no demonstration, that our northern countrymen are a peculiar people. If we pass from a consideration of the society in Scotland to that of the physical character of the country, the change is like some beautiful transformation scene; the feeling is nearly as grateful and refreshing as that which we experience on emerging from a long, dark, suffocating railway tunnel to a fertile champagne country, rich with verdure, and sparkling with silver streams. Take it all in all, there is no country under the sun so varied, and upon a certain scale so magnificent in its natural beauty as Scotland. The highland hills of course cannot be compared to the snow-clad Alps. Loch Lomond must veil its beauty when compared with the Lake of Geneva. Even the Hebrides must sink into insignificance beside the islets of the Grecian Archipelago. But for all that, Scotland is a country eminently calculated to arouse the flame of patriotism, and inspire the soul of poetry and song. Hence it is that the very soil, so to speak, is impregnated with poetry, and the very woods are vocal with music. In fact, we must confess, speaking for ourselves, that after a good deal of patient observation and study of the multifarious subjects, moral, intellectual, and physical, which may be comprehended under the head of Scotland, we are very far indeed from getting to the root of the matter.

For these reasons, among others, we looked, as we have said, with some anxiety to the appearance of Murray's "Scotland." But we are glad to find that the compiler has risen to the occasion; and on the whole, this handbook will amply sustain the high reputation of its publisher's red-covered series. Of course, it would be unreasonable to expect that among the numerous subjects of which it treats no mistakes had occurred. Unless a man possessed the encyclopedial genius of Hermes Trismegistus he could hardly combine the elements of history, poetry, philosophy, archæology, topography, and geology without falling into some blunders. Accordingly there are both sins of omission and of commission in this respect. The Solway Firth, for instance, is not mentioned at all, although the traveller passes close to its northern shore. Holyrood Palace was not built on the grounds of Drumseuch, from which it is distant nearly two miles. There is no mention of "artistic granite" in Aberdeen, one of the staple manufactures of that flourishing seaport. Kinrara belonged to the Duchess of Gordon. Some errors are obviously typographical, as, for example, where we are told to pronounce monzie as monce. John Milne & Son, in Edinburgh, are *brass*-founders, and not type founders, &c. &c. These and such like errors we must view with leniency in the first edition of a book which possesses many solid qualities to recommend it, and we will not dwell upon them. It is a more pleasing task to indicate its merits.

In the first place, there is nothing of the turgid, verbose, and vapid descriptions of scenery—untruthful for the most part—which distinguishes the most of Highland guide-books. This fault originated, we believe, with Dr. Macculloch and his disciples, whose accounts, notwithstanding a copious interfusion of scientific jargon, are habitually exaggerated. Even Mr. Geikie, the most recent exponent of this school, rather allows his language to govern his ideas when he talks, for example, of the "long, lonely moor of Rannoch." Of course a moor is not a meadow; but there are many lonelier moors in Scotland than Rannoch, as we know to our bitter experience; and what is worse, plenty that are far more barren of birds. The editor, in making use of such materials, very judiciously prunes away much of their surplus eloquence; and in place of that we get some account, in a rational way, of the industrial resources of the country. We select for quotation the following interesting paragraph upon "Coal and Iron:"—

> "These products are, perhaps, the most important and characteristic of Scotch industry, employing indirectly at least seven-tenths of the population of the Lowlands. For legislative purposes the collieries of Scotland are placed in two divisions, West and East. The former includes W. Lanark, Ayr, W. Stirling, Dumbarton, Renfrew, Argyle, and Dumfries, and embraces 223 collieries, which produced in 1865, 6,250,000 tons. In the eastern district are E. Lanark, Fife, Clackmannan, Haddington, Kinross, Edinburgh, Linlithgow, E. Stirling, Peebles, and Perth, including 274 collieries yielding 6,400,000 tons. Of cannel coal 322,000 tons were raised in 1865; and the annual consumption of the Boghead coal, which is so extensively used for distillation into paraffine, &c., is equal to nearly 100,000 tons per annum. It may be of interest, as the oil trade from coal distillation has become so very important, to mention that the Boghead coal produces 128 gallons of oil per ton, while the other coals vary from 72 to 90. As regards the iron trade, there were in 1865, 141 furnaces in blast (producing 1,163,000 tons of pig iron), which consumed upwards of 1¼ million of tons of iron ore, all raised in the district. Next to Staffordshire, the Scotch iron market is the most important of any. The principal iron shipping ports are Glasgow and Ardrossan, on the Clyde, and Bo'ness and Grangemouth on the Forth" (p. 30).

* Handbook for Travellers in Scotland, with Travelling Maps and Plans, 8vo., pp. 388. 1867.

In the second place, the arrangement of routes, the wayside divergences, and the variety of schemes introduced for tours of one, two, or three months, in order to suit the different periods of time at the disposal of tourists, are, we find, all that can be expected or accomplished. The clear and precise series of charts from Stanford's geographical establishment, in themselves a most valuable feature, are so introduced as to give the utmost value to the letterpress. The architectural notices are much superior to those in other Scottish guide-books. We quote the description given of Sir Walter Scott's Monument, in Edinburgh:—

The Scott Monument is the most beautiful work of art in Edinburgh, but it is not well placed. It was completed in 1844, from the designs of George Kemp, an architect, who was previously unknown to fame, and did not live to see his plans completed. He was an intense admirer of Melrose Abbey, and has endeavoured in this monument to combine all the characteristics and proportions of that building. Four grand Early English arches support the whole superstructure, which serves as a canopy to the statue. To these main arches four others are attached at the corners, affording to the former a strong lateral support, and sustained themselves by strong exterior buttressed piers, surmounted by pinnacles. From these spring four flying buttresses, which serve to support the arches of the second story. Three galleries of the same style rise above this, so that the monument may be said to consist of a pile of arches in the Early English style, gradually decreasing in size till the whole terminates in a single pinnacle. An interior staircase (admission 2d.) conducts to the top, which is 200 ft. from the ground. Above the principal arches, and in various parts of the structure, are fifty-six niches, which are to be filled with statues representing the most prominent characters in Sir Walter's novels; of these, nine have been completed and put up. Beneath the main arches is placed a statue of Sir Walter Scott and dog, by Steell, a first-rate work of art; but the situation is an unfortunate one, the loftiness of the arches making the figure seem insignificant.

Upon the whole, then, what we have to say of Murray's "Scotland" is to recommend it warmly to our readers, particularly to those who are going north of the Tweed. If they do not find it a "guide, philosopher, and friend," they will probably discover that it possesses as much of that ternary compound as can be conveniently stuffed into a knapsack or packed in a portmanteau.

FROM MELBOURNE.

A handsome stained-glass window was lately on view at the works of Messrs. Ferguson, Urie, & Lyon, Curzon-street, North Melbourne. It is designed for the chancel of St. Peter's Church, Wooloomooloo, near Sydney, and it is the gift of Mr. James Gordon. The window is composed of three lancet lights, and is 16 ft. by 7 ft. in size. It has nine separate subjects, the centre being a large figure of our Saviour. The other subjects bear on the principal events in the life of St. Peter. No. 1 is the calling of St. Peter; No. 2, Peter witnessing the Transfiguration; No. 3, Peter awakening Jesus from sleep during the Tempest; No. 4, the Last Supper. In No. 5, Christ's agony in the Garden of Gethsemane, Peter is shown sleeping, leaning on his sword; No. 6 represents Christ supporting Peter on the water; No. 7, the Crucifixion; No. 8, Christ's charge to Peter,—"Feed my sheep." The style is Early English.

The same artists designed a chancel window for St. John's Church, Launceston. The central figure is the figure of our Saviour in the Transfiguration, and in the two side lights are the accessories. Beneath is Jesus at the Last Supper with the bread and wine. In the three top lights are the Dove and the Alpha and Omega.

The new post-office is nearly completed. In February, 1866, and June last, the *Australian News* gave views of it, an exterior and interior one. The central hall is 80 ft. long by 30 ft. wide, and 47 ft. high. It is lighted during the day by the windows in the roof and sides of the building, and at night by four large sun-lights. The Elizabeth-street frontage is at present 194 ft. long, the intention being to extend it to 316 ft. An arcade runs along the front of the building, affording access to the receiving and delivery windows, registration, sale of stamps, inquiry windows, and private letter-boxes. The opposite side is appropriated to the letter-carriers and receiving-rooms for inward mails, which enter the building by the mail-yard, on the eastern side from Bourke-street. On the first floor access is obtained by corridors to the offices of the corresponding branch on the right or east side, and to the accountants' branch on the west side. A view is obtained from the corridor of the operations on the ground floor, but it is intended to carry a screen round of sufficient height to intercept the view. The necessary supervision will be obtained at the north end, which it is also intended to screen off, but to leave peculiar openings, by which means a watch may be kept up without the cognisance of the Post-office *employés*. The furniture fittings, which are of New South Wales cedar, cost something like 6,000*l*. The rooms are lofty and well ventilated. Around the arcades which extend along the sides, or fronts of the building, tessellated pavement is being laid down of an expensive description. The contractor for the building is Mr. Samuel Amess; and, when ready for occupation, it will have cost close upon 140,000*l*.

The works at Stony Creek, for the supply of water to Geelong, are progressing satisfactorily. There are at present nearly three hundred men in the employ of Mr. J. Chappell. The embankment has been built up to the height of 61 ft., and the stonework of the front of the tunnel is nearly completed, two-thirds of the fencing round the reservoir has been erected, and labourers are sinking shafts at the site of the proposed reservoir at Lovely Banks to ascertain the kind of strata.

The Victorian Chemical Works, Footscray, for the manufacture of kerosene from Sydney shale, consist of a main building for the manufacturing processes, and another building some distance apart from the main one, for containing the oils, and for packing operations. The main building, in which the retorts, stills, and refinery are, is constructed of iron, and measures 100 ft. long, 20 ft. high, and 60 ft. broad. The other building detached from the main one is also of iron, and measures 66 ft. long by 33 ft. in width. The works are situated at Footscray, on the bank of the Saltwater river.

From the Registrar-General's report on the vital statistics of Melbourne and suburbs during the month of April, we learn that the deaths during that period amounted to 393, being a daily average of 13·10, against a daily average of 14·16 in March. The deaths, however, exceeded those of any previous month of April since 1860, with the exception of 1865, when the number was 399. The deaths of children under five years of age numbered 221, of which 115, or about 52 per cent., were of males, and 106, or nearly 48 per cent., were of females.

The first part of the population statistics of Victoria, for the year 1866, has been presented to the colonial Parliament in the form of a blue-book. The number of immigrants who arrived during the year was 32,178, divided into 21,142 male adults, 7,639 adult females, and 3,397 children. From the United Kingdom the arrivals were 4,071 adult males, 3,133 females, and 1,310 children; total, 8,514. From foreign ports the arrivals were 1,439 adult males, 133 females, and 97 children. Of the arrivals from the United Kingdom, 3,610 were warrant holders, and 584 were Government immigrants. The number of warrant-holders was nearly equal of both sexes, but of the Government immigrants there were 513 adult females to 42 males and 29 children. From the neighbouring colonies there arrived 15,632 adult males, 4,373 females, and 1,990 children. From New Zealand, there are 5,043 adult males to only 624 adult females. The number of emigrants who took their departure from the colony was 27,629, leaving a balance in favour of the colony of 4,549. The number of Chinese who arrived was 974 against 1,043 departures. The total number of the population on the 1st January, 1866, is given at 626,639, of whom 357,515 were males, and 269,124 females. At the end of the year the number was 643,912, or 365,317 males and 278,595 females; the increase being 17,273, or 7,802 males and 9,471 females. About three-sevenths of the entire population are given as on the gold-fields, the number being 257,264. The aboriginal population is estimated at 1,908 men, women, and children. There are sixty-two municipal bodies in the colony, including the City of Melbourne and the town of Geelong, containing an estimated amount of rateable property valued at 20,241,073*l*., having an annual value of 2,314,594*l*. The revenue they receive amounts to 341,429*l*., the expenditure being 315,475*l*. The estimated population of the municipalities amounted to 315,939, and the dwellings they contained numbered 68,968, their area 241,930 acres.

In 1865, the imports into the Australian colonies reached 35,000,000*l*., and the exports 30,000,000*l*. Within the last sixteen years New South Wales and Victoria have yielded 150,000,000*l*. worth of gold, and New South Wales has produced 5,000,000 tons of coal. South Australia has also, within the last ten years, exported 5,000,000*l*. worth of copper. The tonnage of vessels which arrived at Australasian ports in 1865 was 2,000,000, and a similar amount of tonnage left those ports during the same period. Forty years ago the number of horses, cattle, and sheep in Australia was under 400,000; the number is now nearly 35,000,000.

A copy of the Official Record of the Intercolonial Exhibition held at Melbourne 1866-67, has been sent to us by the Commissioners. It is a goodly volume of many pages, and besides a business-like Introduction by the secretary and general manager, Mr. J. G. Knight, and the Catalogue of Exhibits, Guide Reports and Awards, it contains eight valuable Exhibition Essays on the Progress of Victoria; its mining and general statistics; its physical geography, geology, and mineralogy; its gems and precious stones; its agricultural resources; its zoology and palæontology; and its climate; and on Australian vegetation. There is also an appendix containing much further information as to New South Wales, Queensland, South Australia, Tasmania, New Zealand, and Western Australia.

THE NEW THEATRE ROYAL, LEEDS.

The new Theatre Royal, Leeds, is in the Italian style of architecture. The entrance to the boxes, the floor of which is tesselated pavement, is by a broad stone staircase, with gilt balustrades, and it is lighted from the dome by a chandelier, and a number of figures in niches in the wall, holding globes. The boxes are entered from corridors, and will be furnished with chairs, instead of inconvenient benches, and besides the front circle of boxes at the sides, there are twelve private and other boxes, approached by separate entrances, that will hold about eight persons each, and the entire boxes will accommodate 220 persons. The pit, reached by an entrance at the side, will hold about 1,100 persons. The gallery is approached by a stone staircase at the back of the theatre, down Waterloo-street, through a covered passage forming part of the building. It will seat 1,150 persons. The entire accommodation of the theatre is 2,516 seats.

The stage was laid down by Mr. Richard Huby, and was built away from the theatre in pieces. The width of the proscenium is 25 ft., and the height 28 ft., and the depth from the front to the back of the stage is 55 ft.

The architects are Messrs. Moore & Son, of Sunderland. Messrs. Nicholson & Son, of Leeds, are the builders.

The entire cost of the building is roughly estimated at from 15,000*l*. to 20,000*l*.

FROM SCOTLAND.

Johnstone (*Renfrewshire*).—Subscriptions for a new public hall having been got, a committee was some time ago appointed to get designs for the buildings. Several architects were asked to submit plans, and the designs of Mr. Lamb, of Paisley, were selected as the most suitable of those sent in. A site was obtained at the corner of Ludovic-square and Church-street. The building will thus have a double frontage of 50 ft. to the square, and of 90 ft. to the street. The principal entrance is from Ludovic-square, on the south, by a hall and staircase to the public-hall floor. The ground-story has a games or amusement room, about 62 ft. by 23½ ft., with a 17 ft. ceiling. It is lighted from the side walls. The reading-room or newspaper-room is 45½ ft. long and 16 ft. wide. The library is 16 ft. square; and the directors' room is 16 ft. by 11½ ft. There is an entrance from Church-street, from which all the rooms on the ground floor can readily be reached by a corridor. There is also by this entrance a special staircase to the public hall, and for concerts or similar entertainments it may be used for the first-class seats. The two staircases and wide entrance-doors give ready means of exit. On the ground-floor are lavatories, bath-room, and other accommodation. On the upper floor is the public hall, 62 ft. long, 46 ft. wide, and 26 ft. high. The hall is entered from both ends of the building, and has a large platform at the north end, with a suite of retiring-rooms for ladies and gentlemen. Attention has been paid to ventilation. The architect has selected modern Italian as the style. The door-piece, with an ornamental balcony over it, is the central feature, and enriched Venetian windows balance the door-piece and light up the upper story. The build-

ing has been contracted for, the contractors being —for the masonry department, Messrs. D. Jaffray & Son, Johnstone; for the carpenter and joiner work, Mr. Robert Whyte, Glasgow; for the slater work, Mr. John Robertson, Johnstone; for the plumber work, Mr. John Stewart, Johnstone; for the plaster work, Mr. James Hutchinson, Paisley.

Kirkwall (*Orkney*).—The new iron pier at the harbour, extending 500 ft. in total length from the head of the East Quay, is now nearly completed. Messrs. Laidlaw & Son, of Glasgow, were the contractors. They were to complete it by the 18th of October, 1866, for a lump sum of 10,490*l*. The progress of the work was slow at first, owing to delays caused by the rocky bottom near the head of the quay deflecting the screw piles, and also by an unfortunate accident which befell the crane, and which terminated fatally in the case of one of the workmen belonging to the town. The narrow part of the pier, extending 332 ft. from the top of the East Quay, is provided with a tramway, which has a crossing in the central part, and a railed-off promenade for foot-passengers, floored with hard wood. Between the broad iron rails of the tramway there is a pavement of asphalte, 4 ft. 4 in. in breadth. The tramway rests on twenty-eight cast-iron piles, connected by arches. The pier, which has an upper and under platform, is 38 ft. in breadth from rail to rail, and 168 ft. in length, making the total extent of the structure 500 ft. There are, at the head, sixty-four iron piles and seventy-three fender piles of strong teak wood. A specialty of the pier is that the timber bracing is separate from the iron framework, so that any injury done to the fender piles by the concussion of vessels driving alongside leaves the iron part of the structure unharmed.

PROVINCIAL NEWS.

Macclesfield.—The foundation-stone of a new Infirmary has been laid here by Earl Grosvenor, M.P. The intended new institution takes its origin in an endowment of the sum of 30,000*l*., bequeathed by the late Mr. Joseph Tunnicliff. An eligible site has been chosen—a vacant plot of ground bounded by two new streets, Cumberland-street and Westminster-road, and adjoining the public park. The building will be erected on the pavilion plan, and be made to accommodate fifty patients. The architect is Mr. Stevens, of Manchester and Macclesfield; and the contract has been let to Messrs. Nield & Sons, of Manchester, for 12,650*l*., exclusive of the furnishing, fitting, &c., which it is estimated will cost 2,000*l*. more. The existing Macclesfield Dispensary will be incorporated with the new institution.

Stafford.—The new Manchester and Liverpool District Bank is now almost completed. The new building is of red brick, with Hollington stone dressings, and the shafts which support the capitals in the windows and doorways are of red Mansfield stone. The style is Gothic, treated with considerable freedom, and a good deal of carving and other ornamentation. The front is divided into three gables, terminating with finials. The whole width is 44 ft. All the door and window openings inside and outside have shafts of red Mansfield stone, supporting carved capitals. The bank itself is 40 ft. 6 in. long by 23 ft. wide. It is entirely lighted from the top by a large lantern with side lights all round it, and which is also partially roofed with glass, an intervening ceiling of ornamental glass in panels serving to soften the effect of the vertical light. The architect is Mr. Robert Griffiths, county surveyor; and the work has been carried out by Mr. H. Lovatt, contractor, of Wolverhampton.

Hoylake.—The Stanley Hotel, at Hoylake, has been formally opened. The building was commenced about four years ago by Mr. Cookson, but owing to a want of funds it remained for a considerable time in *statu quo*. Recently it was taken in hand by the Amalgamated Brewery Company, of Birkenhead. The building stands upon about an acre and a half of ground, and it has a frontage of something like 300 ft. The hotel is intended chiefly as a place of resort for excursionists, and, with this view, it has been built to meet the requirements of all parties. It commands a view of the race-course, as well as of the surrounding neighbourhood. Mr. J. Bratten, of Birkenhead, was the architect; and Mr. Owens, of Hoylake, the builder.

Stafford.—The covered market has been enlarged. The space between the Guildhall and the covered market has been cleared of the old police barracks, and entirely enclosed, adding a covered space, 93 ft. by 33 ft., to the market. On each side of the entrance is a shop, and above these, and extending the whole width of the market, an armoury for the volunteers has been provided, with an entrance at each end, and a place at the back for cleaning arms. The new part of the market is ventilated by louvres. Mr. Griffiths, the county surveyor, was the architect, and the contract was taken by Mr. Christopher Espley.

MANCHESTER TOWN HALL COMPETITION.

Readers will learn with satisfaction that the Corporation of Manchester have carried out the suggestion made in our pages, and have printed a list of the designs received under mottoes or devices. It will be found in our advertising columns, so that all competitors will know if their designs have been received. We are in a position to state also that the committee have called in professional aid to assist them in making their first selection of not fewer than six nor more than twelve, thus offering further evidence that a strong desire exists to do full justice to the competing architects.

We would suggest to the two or three competitors who have addressed letters to us on the subject that they should at least wait until the Committee have done *something* before saying that they have done wrong. So far as we have the means of judging, the Committee appear, and we have said this before, to have the strongest desire to do justice and to bring about a satisfactory conclusion.

SEFTON PARK, LIVERPOOL.

Some few years ago the enormously increasing size of the borough of Liverpool (which had nearly trebled itself in twenty years), induced some of the leading members of the council to consider the best way of preserving open spaces for breathing room, while the land was yet to be obtained at a reasonable rate at the outskirts of the town. They already possessed the Newsham House Estate, situated on the extreme eastern boundaries, and by the munificence of the late Mr. Richard Vaughan Yates, the Princes Park was in existence at the south-eastern boundary. Yet the connecting link between the extreme northern boundary of the borough and the southern was not completed. Mr. James Newlands, the excellent borough engineer, suggested that, if sufficient space was not to be obtained to continue the *cordon* of parks, an inner and outer boulevard, of wide dimensions, should be substituted, well planted with trees, to connect the two divisions of the town to the north-east, east, and south-east, while the noble river Mersey completed the circuit of this densely populated town. But at this time a most popular gentleman, Mr. Robert Hutchinson, late mayor, presided over the Improvement Committee, and he was determined that the whole of the *cordon* of parks should be accomplished. In accordance with this determination the council purchased a large tract of land, some 160 acres in extent, from the Earl of Derby, at the extreme north of the town. This is now being laid out as the Stanley Park, under the direction of Mr. Edward Kemp, of the Birkenhead Park. The corporation then purchased the site of Shiel Park, named after an old and esteemed member of the council, which is now completed and open to the public. This completed the circuit up to the Newsham House Park. The Wavertree Park and old Botanical Gardens continue the line to within a short distance of Parliament-fields, still unbuilt upon. The Princes Park here joins, and at the Ullet-road boundary of this park the Sefton Park commences, and stretches over hill and hollow to Mossley-hill and Aigburth.

The area of the park is 400 acres, distributed thus:—

	a.	r.	p.
Building sites surrounding Park	113	0	0
Botanical Garden	19	0	0
Area of Lake and running water.....	14	0	0
Area of Roads and Drives	64	0	0
	210	0	0

The 190 acres left will be planted and laid out with carriage-drives and walks.

At the latter part of last year the corporation of Liverpool offered liberal premiums for the best designs for laying out the land as a park. Besides the sites for building lots and botanical garden, the council required a review ground capable of reviewing the local Volunteers, a large cricket-ground, and, lastly, a grand boulevard of 75 ft. wide (having a gallop or Rotten Row running beside it), forming a connecting link with the Croxteth and Princes Park roads, which give the chief access to Liverpool from the esteemed quarter of Mossley-hill, Garston, and Aigburth.

Twenty-nine competitors sent in designs, and after calling in and consulting Mr. Nesfield, the distinguished metropolitan gardener, the Council awarded, as we have before now stated, the first premium to the authors of this design—Mr. Edward André, of Paris, and Mr. Lewis Hornblower, of Liverpool; the former gentleman having charge of the public parks and gardens of Paris, and the latter being a local architect, who had the advantage of experience in these matters under the direction of the late Sir J. Paxton.

We give a bird's eye view, which will explain the whole arrangement proposed. The boulevard is in the foregound, running from Croxteth-road on the left to the Garston-road on the right, a distance of one mile and a quarter.

The Park proper is enclosed by a carriage-drive 50 ft. wide, with side footpaths.

The Botanical Gardens are enclosed with iron railings, and are centrally situated, with a south-westerly aspect. Nineteen acres are devoted to this department. It seems well arranged, and includes many modern improvements.

The contour of the land shows a valley running longitudinally down the centre of the park, while about half-way down this valley another joins, coming from the Mossley Hill side. Both valleys have a great fall 45 ft. towards the lowest part of the land. This fact, and the small streams which issue from the heads of each valley, suggested to the designers a series of cascades leading from the heads of the valleys to the lakes at the lowest or Aigburth-road entrance to the park.

These cascades are eleven in number, varying in the depth of fall from 12 ft. to 6 ft., and are formed with ornamental rockwork and other accessories. Five bridges will span the streams at various selected spots, each bridge varying in design and size. Footpaths of 10 ft. wide follow the windings of the rivulets, and intersect the ornamental plantings surrounding the lakes, &c.

Secondary carriage-drives of 30 ft. wide follow the course of the lake, and intersect with the main drives round the park. At many commanding spots kiosks and other ornamental buildings will be erected. A large band pavilion, first and second class restaurants, a cricket pavilion, with markers' pavilions, covered sheds for equestrians, boat-houses, deer-house, &c. &c., will be provided.

Lodges will be placed at all the entrances, and it is the wish of the council that these should be habitable as well as ornamental. Houses for the curator of the gardens, grand conservatory with monumental cascades, fountains, &c., will be introduced. Some few of the elevations of these buildings we have engraved.

The park and garden are estimated to cost 140,000*l*., and it is expected that the sale of the building lots, 290 in number, varying in size from 1,250 to 6,000 square yards, will nearly repay the council for their outlay in the purchase of the land and laying out the park; at any rate, the difference will be amply repaid by the large open park area of 190 acres secured to the public for ever.

The staking out of the roads and drives is now being proceeded with rapidly; but it is intended, when the fences are down and before the earthworks are commenced, that an opportunity shall be given to the county of Lancaster and its northern neighbours to show what their Volunteer army can do in a review on a grand scale; and it is expected that, on the 3rd or 4th of October, some 25,000 Volunteers of the northern district will be reviewed by H.R.H. the Duke of Cambridge.

It is expected, and indeed arranged, that the whole of the works will be completed in two years from the date of the contracts. We may state that, since the resignation of Mr. Hutchinson from the council, the corporation have selected Mr. Joseph Hubbach as the chairman of the Improvement Committee, under whose auspices every encouragement is given to the designers to carry out their work in its entirety and without interference.

The views we give represent, in order, beginning at the top, The Main Lodges and Gates; The Head Gardener's House; The Shepherd's House; and the Cricket Pavilion.

a

BOROUGH-OF-LIVERPOOL

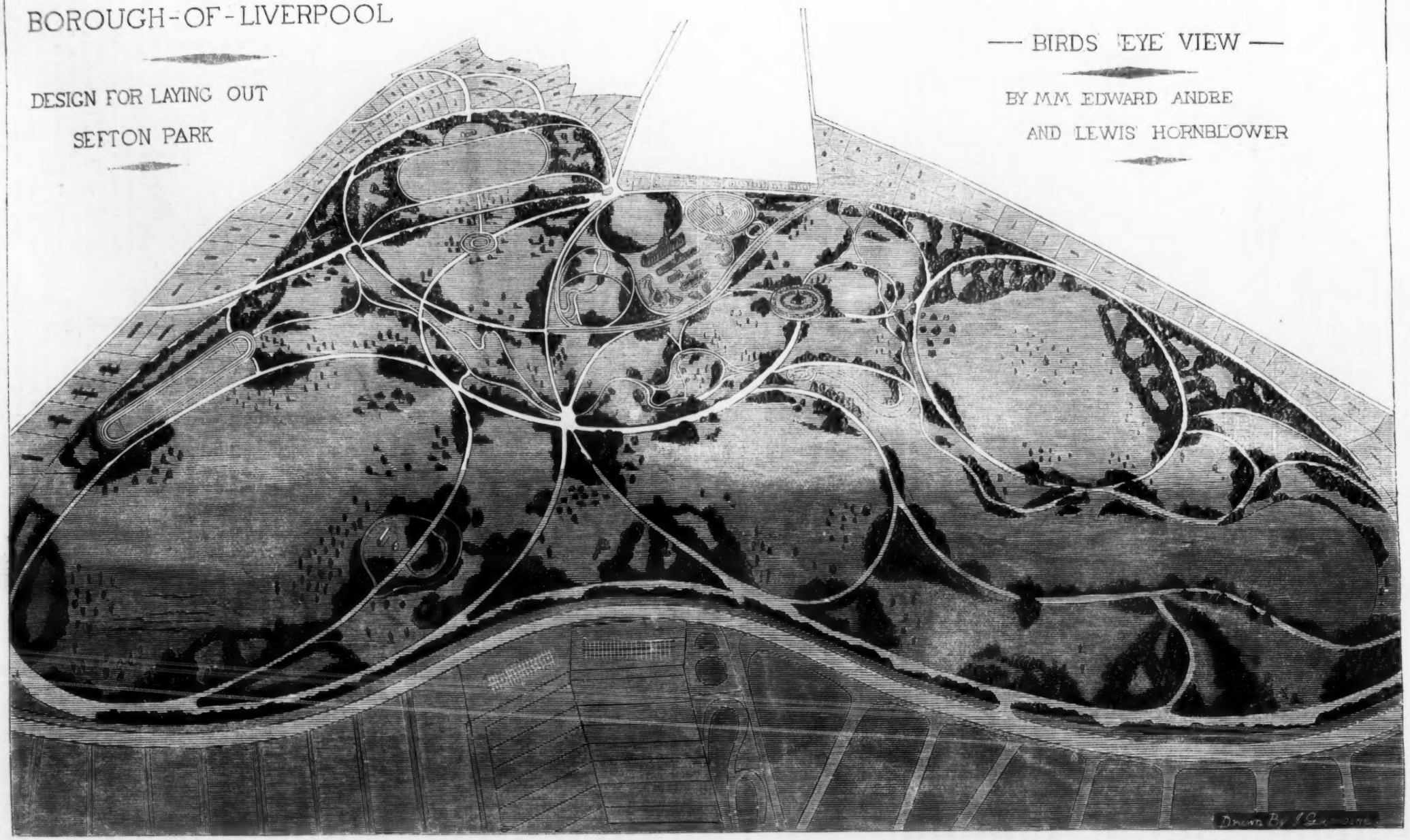
DESIGN FOR LAYING OUT

SEFTON PARK

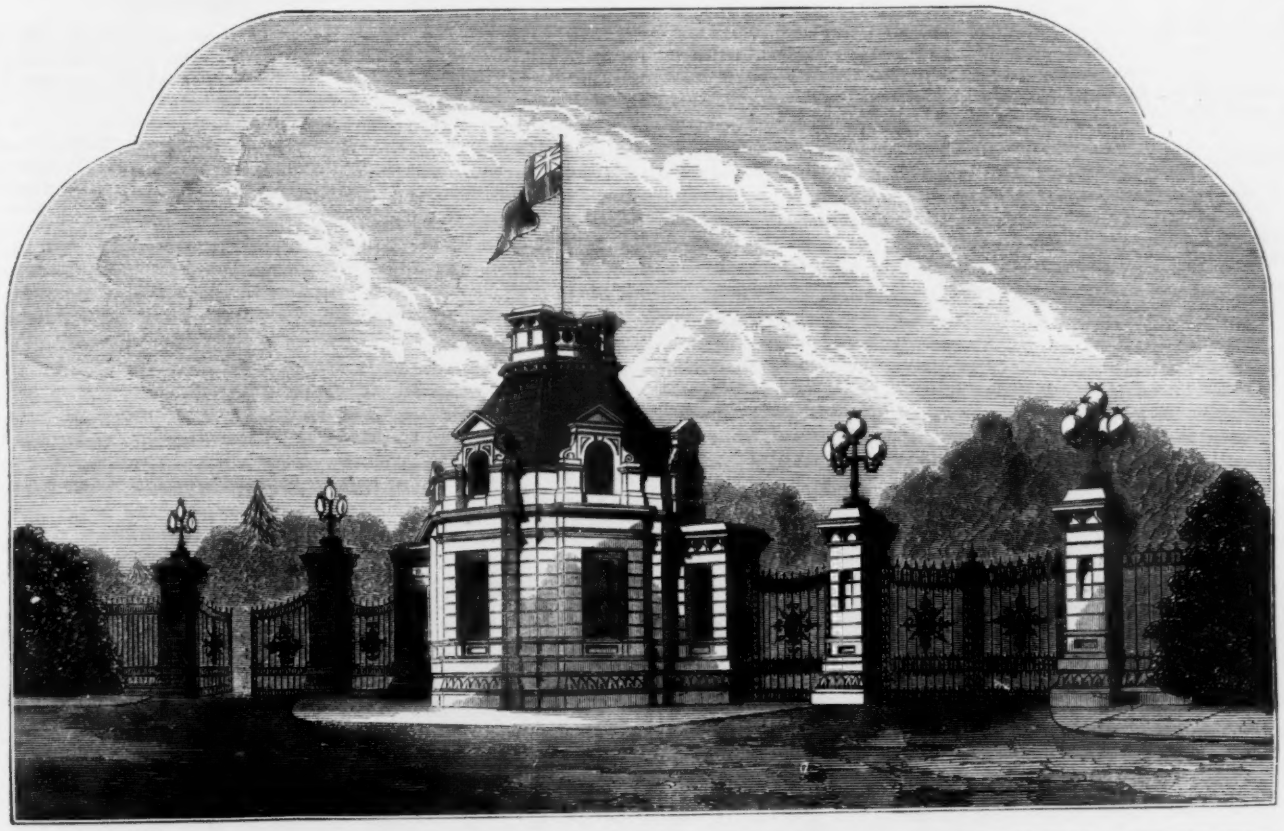
— BIRDS EYE VIEW —

BY MM. EDWARD ANDRE

AND LEWIS HORNBLOWER



BUILDINGS DESIGNED FOR SEFTON PARK, LIVERPOOL.



DISCOVERIES IN KILDALE CHURCH, YORKSHIRE.

In the course of the works here, just within the line of the north wall of the church, a series of interments, laid east and west, and with the head of one near the feet of the next, were found to the number of seven or eight; and with them a number of weapons of iron and articles of bronze. Among the former were three swords, an axe, three or four daggers (presumably: from the state of corrosion it is hard to say decisively that one at least is not a spear or javelin-head), a knife in a bone handle, portions apparently of spurs, &c. Among the last is a pair of tweezers, a curious object consisting of two legs, each 2 in. long, set square in the ends of a cross-bar (about half the length of the legs), and terminating each of them in movable rings, not unlikely a means of suspension for some object or objects unknown; the remains of two hemispherical bowls of thin metal, about 2½ in. in diameter at the mouth, and perforated with four small holes near the rim, which probably or certainly formed parts of a balance. A plug of lead also was met with, which, from the green metallic matter about it, seemed to have come from a bronze or bronze-lined socket; and a shield-shaped and decorated plate of bronze, which may have been the chape of a sword or dagger-sheath. A small wooden frame was also found, with a movable panel, inclosing a small plate of lead, about the thickness of half-a-crown, and ⅞ in. by 1 in. in dimensions.

A writer in the *Yorkshire Gazette* considers,—the axe-head, and one at least of the swords, are so characteristic that they belong to the period of the Danish occupation of Cleveland. The dispossessed owners of Kildale, named in Domesday, were Orme and Ligulf; and there can be no reasonable doubt that they were heirs—at least successors—to others whose nationality was as distinctly declared by their names, as in the case not only of these two, but in that of twenty-one more out of the twenty-seven owners in Cleveland specified in the Domesday Book. It is scarcely a mere surmise that some of the earlier of these settlers—perhaps not quite the earliest—might be buried within the limits of a Christian edifice and yet not without the accustomed weapons of their heathen fore-elders. The swords lay with the blade obliquely across the bones of the leg, the hilt at the right hip. The axe lay on the insteps of its one-time owner, so that its helve must have reached up to or towards his right hand.

THE TRADES MOVEMENT.

A subscription has been set on foot for the purpose of raising a testimonial to Mr. W. C. Leng, the editor of the *Sheffield Daily Telegraph*, for the important and manly part he took in reference to the recent outrage commission, and a sum of about 200*l.* has already been subscribed. After the New Hereford-street outrage in December last, Mr. Leng advocated the appointment of a commission with extraordinary powers, for the purpose of making a thorough investigation. He also broadly stated that there could be no doubt of the complicity of some of the trades unions in that and similar outrages which had disgraced the town, and meetings of trade societies were held at which the accusation was denied with great warmth, Broadhead being, perhaps, the most emphatic and energetic in "hurling back the foul imputation." While Mr. Leng was writing on the subject, one of Broadhead's accomplices (Hallam)—who subsequently gave most important evidence before the commissioners—called upon him and made a confession, which was communicated to the police, and proved to be of the greatest value. Notwithstanding threats of vengeance, and combined efforts to damage the circulation of his paper, Mr. Leng persisted in his demands for a commission. In this he was cordially assisted by merchants and manufacturers of the town.

In speaking of the efforts of the local press, it should not be forgotten that in a less prominent but in a firm and courageous manner, this exposure of dangerous rascality was materially promoted by the editor of the *Sheffield Independent*. We may here note that the Sawgrinders' Union have virtually and formally confessed themselves to be accomplices of the despicable Broadhead, at least after the fact, if not also before it. It is to be hoped Parliament will know what use to make of this confession.

Liverpool.—The Operative Carpenters and Joiners have met to consider the new trade rules proposed by the masters. Several amendments to the proposed rules were submitted and carried The eighth rule proposed by the masters was as follows:—

"Each employer shall conduct his business in any way he may think advantageous in the matter of letting piece-work, employment of society or non-society men, taking apprentices, using machinery and implements, and in all details of management not infringing the individual liberty of the workmen."

The adoption of this rule was strongly opposed, and the rule was rejected.

Glasgow.—The masons are on strike at the University Buildings. The original cause of the dispute was the employment by Mr. Thomson, the contractor, of certain non-union men, and his refusal to dismiss these when requested by the unionists to do so. The immediate result of the misunderstanding was that nearly all the builders and hewers then engaged on the works, numbering 180, threw down their tools, leaving on the ground only labourers, quarrymen, smiths, and joiners. Mr. Thomson, however, adhered to his determination to employ non-unionists if he saw fit. In the absence of masons employment was given to the labourers and quarrymen in obtaining stone, and thus at least one important branch of the work was vigorously pushed on. Meanwhile, masons continued to come in on Mr. Thomson's terms, and by this time, it is said, the full complement would have been made up but for the unionists. The result is that only some seventy-eight masons have yet come in, the number required being about 250. Some of those who have accepted employment were unionists.

THE METROPOLITAN MUNICIPAL GOVERNMENT BILLS.

Besides the scheme proposed by Mr. Ayrton's committee, two Bills were brought into Parliament by Mr. Mill, M.P., under the auspices of the Metropolitan Municipal Association, 1, Adam-street, Adelphi. In introducing the second of his two Bills, Mr. Mill said the Bill embodied the remainder of the plan which he had introduced in another Bill at an earlier period of the session. It could not be expected that the Bill could be carried into effect that session, and his object was simply to have it printed, so that it might be laid before the public with a view to its being considered next session. It provided for a central government, and proceeded very much in accordance with the recommendations of a commission which had considered the question. It enlarged the City corporation into a municipality for the whole of London, leaving so much of the present corporation in the City as was necessary for purely local purposes. There would be a mayor and two aldermen for each district, they being those candidates for the common councillorship who had the greatest number of votes. The corporation property would pass into the possession of this larger municipality. The City, it was right to say, had not yet authorised this cession. It was proposed that the City should have twice the number of representatives in the common council that its population would justify; it would thus have six aldermen. It was proposed that the county of the City of London should become the county of all London, and should have one commission of peace, of which all the aldermen should be members. As a temporary measure it was proposed that the Board of Works and all the present aldermen should be added to the council, Sir John Thwaites being appointed chairman of the standing committees at his present salary, provided that he was willing to accept the office.

The Metropolitan Municipal Association have issued, in a printed form, "Notes in explanation" of these two Bills. The first of the two, they state, is so framed as to be capable of passing into law alone, although the two form in reality one whole, and could be passed, *pari passu*, with an enactment in the second that the two should be construed as one. The objects of the two are thus summarized in the "explanations:"—

1st.—To extend throughout the metropolis that local municipal life which is characteristic of our towns, but which, in the metropolis, has hitherto been confined to the City of London.

2nd.—To retain the Corporation of London as one of a group of district municipalities, all henceforth to be represented in a common council.

3rd.—To establish a central municipal authority over the whole metropolis, absorbing into it the Corporation of the City of London and the Metropolitan Board of Works.

The term "London" in this summary means the whole of the metropolis, and "City of London" the City proper only.

In contrasting Mr. Ayrton's scheme with this one, it is submitted that the humbler scheme embodied in the Metropolitan Municipalities' Bill and the Metropolis Municipal Government Bill offers over Mr. Ayrton's the following advantages amongst others:—

1st.—It is self-acting, and can be put to work without any Government interference.

2nd.—It is based upon principles and embodied in forms which are approved by experience and familiar to the people.

3rd.—It makes use, as far as possible, of all existing municipal agencies, and developes instead of destroying them.

4th.—Whilst far more moderate in its immediate aims, it affords a basis broad enough to include hereafter every reform which experience may show to be desirable.

Mr. Ayrton's scheme, it is maintained, is "characterised by centralization and official interference," while Mr. Mill's, though introducing a vast change in the municipal administration of the metropolis, avoids these characteristics, and is essentially conservative.

THE COST OF METROPOLITAN PAVING.

A report from the Highways, Sewers, and Public Works Committee of St. Pancras has just been printed for the consideration of the vestry, showing the outlay for paving purposes, as well as the additional sum thrown upon the parish by the abolition of tolls, by which that vast monopoly, the London General Omnibus Company, has derived enormous advantages, without affording the public any adequate benefit. The report sets out by stating that for 1866 the rates levied for paving purposes were insufficient by 4,600*l.* to meet paving requirements, whilst at the same time extraordinary expenses had to be incurred out of the general rate, making a total under this head of 2,975*l.* The cost of works in relaying footways and paving intersecting portions of adjacent roads in connexion with paving certain of the late turnpike roads, had been 6,976*l.* The total cost of paving these roadways amounted to 49,661*l.*, for defraying the cost of which 50,000*l.* had been borrowed by the vestry. In consequence of works executed there was a large quantity of surplus material in the depôt, which being available for other streets requiring repair, might be regarded as an asset to the value of 1,500*l.* Amongst the estimates for 1866 was an item for repairing the carriageway and footways of Tottenham-court-road at a cost of 8,288*l.*, but the old paving could be dressed for other thoroughfares of lesser traffic. After referring to the payment of great works on roads, such as Gray's-inn-road and others, out of the general rate to the extent of 13,000*l.*, which they considered a great mistake, the committee report that the cost of maintaining the roads thrown upon the parish by the abolition of tolls was 11,000*l.* per annum; but the vestry having borrowed the 50,000*l.* referred to, and paved with granite those portions of the old turnpike roads that were subjected to the heaviest traffic, had reduced the cost of maintenance, including the payment of the instalment of loan and interest to 8,400*l.* per annum, which was equal to a rate of 2½d. in the pound. The appendix to the report thus shows that the amount required for paving works in the parish of St. Pancras in 1864, the year in which tolls were taken off and turnpike roads thrown on the parish, had been: March, 18,097*l.*; September, 17,710*l.* In 1865,—March, 18,517*l.*; September, 21,607*l.* In 1866,—March, 18,794*l.*; September, 21,710*l.* In 1867,—March, 21,842*l.*;—total, 138,277*l.*, the amount for all purposes required under the general rate for the same period being 170,156*l.*

HOW TO COOL HOUSES?

Can any of your correspondents oblige me with information on the following subject? I must premise that I have been for many years a resident in India, and am about to return there. A cool house is an object I seek with earnestness, as essential not only to the comfort but to the health and happiness of myself and my family. Some fourteen or fifteen years ago, Professor Piazzi Smyth suggested that this object might be accomplished by the expansion of compressed air cooled down while in a state of compression to the temperature of the surrounding atmosphere. It is well known that air will give

out its heat under compression, and will, in consequence, be colder on its re-expansion than it was before. Professor Smyth's idea was that it would be practicable to compress the air in strong vessels outside the house, and then allow it to expand, after being cooled down, in the interior, to which it would be passed through pipes. In 1854 I met with a paragraph in the *Calcutta Literary Gazette* which stated that a paper had been read on behalf of Mr. Macquorn Rankine, at the meeting of the British Association for the Advancement of Science, which described how this mode of cooling houses might be applied; and which stated that a one-horse power steam engine with a bell receiver would compress 66,000 cubic feet of air per hour to so great an extent as to reduce its temperature 30°, say from 90° to 60°. A much less quantity would be sufficient to cool an ordinary house as greatly as would be necessary or pleasant, and the plan, therefore, seems to be as practicable and convenient as could be desired. Yet, strange to say, though the comfort and happiness of great numbers in India, where families are constantly broken up by the ill-health produced by heat, would be secured by its operation, I have been unable to learn by any inquiries that I have had it in my power to make either in India or England, that it has ever been tried, or that any notice has been taken of it. The only mention I have seen made of it was in a short paragraph in the *Friend of India*, in which it was spoken of as too expensive for use; but this could not be if Mr. Rankine's statement was correct. What I now seek is information about this mode of cooling houses, whether it has ever been tried, and with what result, and I should be extremely obliged to any one who could afford it. Steam-power I could not command; but I suppose that of a one-horse power engine could be obtained by the use of oxen. I cannot say that I understand, from the imperfect description given in the paper I have referred to, the mode of operation propounded by Mr. Rankine. The plan which appears to me the most feasible would be to compress the air by means of a condensing pump, in a long air-tight cast-iron tube, running through a small canal of water, and opening into the house, the end in the house being closed with a valve so loaded as to produce the requisite degree of condensation.

INDICUS.

HOUSE DRAINAGE AND VENTILATION.

SIR,—Our experience before and since our combined works of water supply and drainage came into operation (at Leek) is so exactly in accordance with the views expressed in your recent leader (p. 581), that I cannot help forwarding you some practical detailed results as to our case. A large portion of my time during the last ten years has been devoted to the important question upon which you write so forcibly. The system of ventilation you advocate has been practically tested here during the last six years. Atmospheric air is admitted into the main sewer at the lower levels, and sulphuretted hydrogen and other light poisons are carried off by 3 in., 4 in., and 6 in. pipes from the drain heads at the high levels. Nature is thus allowed to do the whole work of ventilation herself. I have frequently demonstrated chemically the truth of what you say as to the propriety of ventilating every drain. Where a drain, quickly ascending off the main sewer, is not ventilated, fill one vessel with the atmosphere of the drain at the drain-head, and another from the street sewer, where the drains enter, and in nearly every case the latter *will* support life, while the former *will not*.

Experience justifies me in stating that I know of nothing so mischievous as allowing slop-stone pipes to be directly connected with the drain; when this was allowed here, I found 40 to 50 per cent. where the bell-trap was either defective or removed, and a constant stream of gaseous poison entering the house. Taking the slop-stone pipe through the wall unto a trap outside, in the manner you suggest, would, in my opinion, if universally carried out, save thousands of lives.

I do not approve of street gullies being untrapped, except here and there one at very low level, where, if a few dry shavings are kindled, the draught is forced inward.

Our town drainage was executed by Mr. C. Slagg, C.E., now borough surveyor at Kingston, at a total cost of about 10,000*l*. We have lately gone through the mains, and I do not think a hundredweight of sub-soil could be found in the entire length.

The chief advantage has been derived by the poorer classes. The following is an example in proof:—During the six years previous to the drainage works the mean number of members belonging to the Leek Burial Society was 5,178, and the total number of deaths 984, and the average age at death 18·66 years. During the six years since the new drainage works came into operation it stands thus:—Mean number of members 5,988, number of deaths 608, average age at death 27·06 years; showing the decrease in the number of deaths, corrected for the increase of members, to be 475, which is equal to a decrease in the annual rate of mortality of 13·24 to 1,000 of the living. The increase in the value of life is 8·4 years. I estimate the total number of weeks' sickness prevented amongst these persons during the last six years to be upwards of 40,000. It is found that one-third of the total amount of sickness experienced occurs between the ages of fifteen and fifty-five years. Supposing each male between these ages to earn 10s. per week, and each female 5s. per week, and the medical and other expenses attending each person sick to be 10s., and the cost of each funeral 5*l*., the total saving to this portion of the community, under these heads, during the six years, amounts to 2,000*l*. more than the entire cost of the whole of the drainage works. And supposing the same state of things that has existed during the last six years to continue during the after-life of the present members of this society, the total saving that will have resulted to them under these heads, when the last shall have died off, will be 61,978*l*.

ROBERT FARROW.

THE LAW COURTS COMPETITION.

SIR,—I beg to offer a few words in correction of a statement in your impression of this week.

What I said in reference to the reported double award of the judges did not amount to a protest, but only to a suggestion of the question, whether or not such an award would be consistent with fairness to the competitors, and the impression under which they had entered the competition. The opinion said to have been offered by me as to my own claims and to my position in the competition would have been most unbecoming as proceeding from me, and I need hardly add, was not expressed.

I will only add, that I have no kind of doubt that Mr. Barry and Mr. Street would produce an excellent building, my only doubt being as to the justice, according to the customary rules of competitions, of thus, as it were, clubbing together the merits of different competitors. Should this, however, be thought right by those best authorized to judge, no protest shall proceed from me; but I shall rejoice if a noble result is the consequence.

GEO. GILBERT SCOTT.

P.S.—I am sorry to observe that my cause has been taken up by an over-zealous friend, in one of the papers, in a tone which I should never have for a moment sanctioned had I been consulted.

BATHING.

IT appears to me that all our watering-places should provide enclosed bathing-places, so as to be available "*at all times of tide;*" either in form of "*floating baths,*" or fixed ones formed of an enclosure of piles, and a timber grating rising and falling with the tide. Nothing can be more gloomy or uninviting than our machines, with the hoods behind drawn down, excluding sun and air. If the "Continental mode" is objected to by the fastidious here, separate the sexes; but why confine them to the limit of a small machine? There is no bathing in the proper sense of the term here.

Owing to the tides bathing is rendered very difficult at the proper hours. Is a remedy so difficult? What is wanted are proper baths and bathing-places. NATATOR.

FUTURE COMPETITIONS.

SIR,—Will you allow me a line to repeat the suggestion I made some time ago as to the future of architectural competitions? It is that in all cases the architects competing should be required to furnish *bonâ fide* drawings of the future building and its details.

Suppose in every instance, as a just free trade trial, a *plan, section,* and *elevation* only be sent in the actual drawing of the architect *himself* as evidence of his power as an artist, not all clerks' work and the result of hired assistance. So much for the general competition open to the world. The next process should be to reduce this number to three or six or twelve, according to extent of the work, and to demand of those competing *illustrative* drawings so as to show the design fully, and these drawings to be paid for as in the instance of the Manchester Town Hall competition. Thus would two ends be gained,—first, *the whole art could and would have its chance,* without the excessive labour of complete drawings, but yet enough; and next, the real competing architects would feel that they were earning their wages fairly by the being paid for, to a certain extent, profitable and assured work; and finally, and not the least, a blow would be struck at the present bad system of putting forth a series of drawings, and evidences of fine art capacity, wholly the handwork of others, who never appear in it, except, perhaps, to hear it told to the world afterwards as the reason of the short coming and final failure that *they,* and not their employer, who gets everything, are the real and primal cause of that failure. The whole future of art in reality depends on the following of this course and principle of action,—that of the *bonâ fide work of the exhibiting artist* becoming a *sine qua non.* I think this idea has already begun to live, and that the result of the Law Courts competition partly proves it; and surely, sir, it is the interest of every artist and architect and artist workman, to help to make the *public* aware of its absolute necessity. Until this be done an *architect's* competition is an impossibility—the resultant work is "starved," for the *real* workers are starved!

C. B. A.

BOARDS AND SURVEYORS.

SIR,—The enclosed application for the office of "District Surveyor" has been sent to the Watlington District Highway Board, Oxon, in reply to an advertisement in your pages, the character of which should not be passed unnoticed.

S. T.

(Copy.)

SIR,—I wish to apply for the post of district surveyor for Watlington, having been brought up in that line, and I can produce first-class testimonials from all the most eminent London surveyors. I have passed the examination at the Royal Institute of British Architects, which is necessary under Act of Parliament, before one can perform the duties of "district surveyor."

Having hitherto found the scope for my intellectual powers rather confined in London, I look forward with "Great Expectations" to an open tract of 150 miles of country, with a salary of equal amount.

My influential relatives offer to advance the security of 200*l*., which might be deposited at interest with the Society for the Prevention of Cruelty to Animals for the benefit of the horse.

Gathering from the obscure wording of the advertisement that the Board find the horse, but that I should have to find the *board,* I wish to ask whether his appetite is good, and how are his poor feet? Do the Board pay the turnpikes? Does the horse go quiet in harness, or do they expect to find an ass to ride him?

The advertisement does not give me a chance of judging of the handwriting of the Board, but having been educated at Oxford I will undertake to write as clear English.

Should I be entitled to parochial relief from *each* of the thirty-nine parishes? My wife takes in washing. Would the Board undertake to push the business in influential quarters? Should I be allowed time for turning the mangle? and how much of my "whole time" could be devoted to sleep?

CLAUDE VIATOR.

To the Clerk to the Watlington Highway Board, Oxon.

WINCHESTER DRAINAGE COMPETITION.

SIR,—The blundering one idea of the Winchester Local Board (the utilization in Chilcomb Valley) having resulted in a complete muddle as to the second and third premiums, the only honourable course open to them seems to me, to at once recall the rejected designs, and submit them all to Mr. Botham, or any other competent engineer, as they ought to have done in the first instance.

In the Farnham Drainage Competition the Local Board fortunately had the advice of an eminent civil engineer residing in the neighbourhood, and upon his suggestion they at once sent the whole of the competing designs to Mr. Leather, for him to decide their merits. These amateur engineers at Winchester, however, were above (or below) advice, including that of their own surveyor, and now behold the result.

The arrangements suggested above, though not including the first premium (which I imagine is now unavoidably awarded to "No. 7") will show that the Winchester Local Board are willing to acknowledge their error, and refute the unpleasant (though not unreasonable-looking) statement of your correspondent "Competitors," that "they *have obtained designs under false pretences.*"

ONE OF THE REJECTED.

APPARATUS FOR BUILDING CONCRETE HOUSES.

WE have received a communication from Mr. Tall in reply to Mr. Conybeare's letter (p. 594 *ante*), stating that he only claims "improvements in apparatus," and that his apparatus is superior to that referred to. Those who are interested can compare for themselves. As to the strength of concrete, the writer adds:—

"In order to prove to the public and to 'H. C.' how erroneous his statements are, I will make a beam of concrete, and let him make a beam of ordinary brickwork, and if my concrete beam is not only ten but twenty times stronger than his brickwork beam, I will forfeit 50*l*., he to forfeit a like amount if it is so. And further, as he says my apparatus is 'in all respects identical' with the one he professes to know so much about, I challenge him to make one of them, and build a wall, say 40 ft. high, and I will use my apparatus and also build a wall, and if I do not build twice as fast, with the same number of men, that is 2 ft. to his 1 ft., I will forfeit 50*l*., he also to be subject to a like forfeit if I do so."

WANTED: INFORMATION.

Observing in your interesting number of the 3nd inst., a statement about a new cement, the main elements of which are magnesia and chloride of magnesium, I presume many of your readers have by this time experimented thereon. Would you be so good as to ask some of them to contribute the result of their experience, together with the information where the above materials can be readily procured, and the cost of each article, and oblige, A Sand-rail.

Various inquiries continue to reach us as to what was described in our pages some time ago as "Italian plaster," and said to be obtainable in Ipswich. We shall be glad to receive precise information on the subject. The recent rains have penetrated brick walls and stone walls in all parts of the country. Some means of rendering walls waterproof are anxiously asked for by a dozen correspondents. At present we can but refer them to previous numbers of the *Builder*, wherein various remedies have been at different times discussed.

DEERING AND WYATT.

Sir,—Your correspondent P. C. says (p. 568), "We come now to Joseph Gandy, *elder brother* of John Peter Gandy. He took the name of Deering," &c. &c. Joseph Michael Gandy should be styled *A.R.A.*: he was the most celebrated architectural draughtsman of his day, but he did *not take* the name of Deering as stated, that name being taken by his youngest brother, John Peter Gandy.

Drury Lane Theatre was the work of Mr. Benjamin Wyatt, son of James Wyatt. Apsley House, "as we now see it," was designed by Mr. Benjamin Wyatt and his brother Philip, and not by S. and B. Wyatt. A. B. C.

COTTAGE PLANS.

A correspondent of the *Suffolk Chronicle* states, in reference to the cottage plans exhibited at the late Royal Show, that the Suffolk Agricultural Society have offered 10*l.* towards the publication of the two prize plans, upon condition that each of the members should have copies, and have appointed a committee to carry the matter through, and if the amount of subscriptions is sufficient, to publish other plans with them. The expense of reducing and publishing 500 copies each, containing a dozen plans (giving elevation, section, ground, and chamber arrangements of each cottage) would be about 60*l.* For 10*l.* or 15*l.* more an additional 500 could be struck off. A subscriber of 1*l.* will probably have ten copies; one of 10s., four copies. Subscribers' copies to be from the first impressions, and copies not subscribed for to be sold to pay expenses.

We have received a letter, signed "Alfred Creer," stating that the design for which the Suffolk Agricultural Society awarded the second premium to Mr. Shaw (see p. 575 *ante*) was in reality by the writer; and that our "error" as regards the authorship "has occurred through a friendly arrangement having been made between Mr. Shaw and himself for a simple exchange of names in the matter of this competition." It is somewhat cool, certainly, for a man who has written a lie to tell those who believed him that they have committed an error. We advise Mr. Alfred Creer to avoid all such "dodges" in future, and to stick to his own name before he is made ashamed of it.

LABOUR AND PRICES IN SYDNEY.

Sir,—I am not surprised that you should have been led to write as you have done upon receipt of the "memorial" from the Sydney operatives, although I cannot but notice that towards the conclusion of your article you are insensibly led to confess to some misgiving as to the accuracy of the averments in the "memorial." If I can satisfy you that the statements in the "memorial" are fallacious, your whole argument falls to the ground. Although I do not append my usual signature, I am not unknown to you, at least, by report, and you will admit I am in a position to speak on this subject, and that what I write may be relied on. I am bound, however, to preface what I have to write by acknowledging I am a resident in Melbourne and not Sydney; but so far as comparison of wages with cost of living is concerned, my visit to the latter place and frequent correspondence enable me to state that the Sydney operatives have the advantage of their brethren here. There is one other matter favourable to the "memorial" I have also to admit; that about the time it was despatched the prices of meat were ruling higher than they are here now.

Having thus somewhat cleared the way, let me now institute a comparison of wages and cost of living in Melbourne; and just now there is pretty keen competition, particularly in the building trades. All the operatives in Melbourne work only eight hours, for which, as is stated, they receive from 8s. to 10s. per diem, some working piece-work even more. Labourers engaged on buildings receive 6s. to 8s. The proportion of employment is much higher than stated. I do not say that men are never out of employment, but I constantly hear contractors complaining of the difficulty of getting men; and of this I am certain, that because good workmen are scarce many men are employed here who would not be tolerated in England. A good workman in any trade here can always ensure employment.

Then as to living, let me give you some of the prices quoted to me in the market this morning. Large cabbages 1d. each, cauliflowers 4d. each; last week 3d. each. Turnips and carrots 1½d per bunch. Mutton from 2d. to 3d. per lb.; by the side 2½d. Milk is selling at 3d. to 6d. per quart, according to locality. Bacon and cheese at 1s. and upwards per lb. Tea from 1s. 9d. upwards; sugar from 3½d. All groceries can be had of the best quality and at very reasonable rates. Boots and shoes can be had good and at fair prices. Rents vary, of course, as to locality from 5s. and 6s. upwards for 4-room cottages. I think I have already jotted down sufficient to show you that our operatives are not so badly off as some would have you believe. I could name some in several trades who are letting house or houses to others. These are among the poor oppressed workmen who warn their fellows in England not to come to Australia. Was there ever a more hollow pretence? I am sorry to say that, with scarcely an exception, the leaders of these trades unions are not the most successful or most reliable men in their several callings; that there are good workmen connected with the unions I admit; but they generally join in self-defence, the roughs, like scum, rising to the top.

You were misled when you wrote,—"There are no well-lighted . . . . shops," &c.; "no lofty smithies, with engines for turning lathes for fitters," &c. &c. Not only have we steam, but water-engines employed. Indeed, machinery to a very large extent is used in various trades, and but few builders are without proper accommodation for their workmen. While I should be afraid to venture on stating the number of well-appointed foundries supplied with every appliance, engine-driven lathes are in almost every such establishment, while already some two or three steam-hammers have also found their way to the colony. If you recollect that we are only a small community, some 700,000 in the whole colony, these facts will stand out much more prominently, and prove that our men are made of the right stuff, are full of indomitable energy. To the man who is not afraid to work and knows his business, I say there is plenty of room; let him come.

Melbourne.

P.S.—Since the above was written the following clipping appeared in the Melbourne *Argus*:—

"The whole of the moulders employed in the Victoria and Phœnix Foundries, Ballarat," says the *Post* of Monday, "have struck work, in consequence of a proposal by their employers to reduce the rate of wages from 15s. to 13s. per day.

THE THAMES EMBANKMENT.

The engineer to the Metropolitan Board of Works has reported on the progress of the embankment. We give a condensed abstract of the report. "Contract No. 1, between Westminster and Waterloo Bridges—The dams are completed, and portions removed from the works where sufficiently advanced; 3,262 ft. of the low level sewer, 3,244 ft. of the subway, 2,925 ft. of the smaller sewer for intercepting the drains from the foreshore, and 284 ft. of the flushing culvert are also complete. About 320 ft. of the Westminster Steamboat Pier and the face wall next the bridge, the main wall, return wall, screen and retaining walls, &c., are all in a very forward state; 586 ft. of the adjoining river wall are complete, and a further length of 134 ft. has been brought to a height of 3¾ ft. above Trinity high-water mark; 100 ft. of the York-gate substructure are brought to a level of about 1 ft. above that mark; 260 ft. of the river wall adjoining are complete, and a further length of 463 ft. is constructed to a height of 3¾ ft. above Trinity datum; 45 ft. of the Charing-cross Pier are brought to the same level, and excavating, concreting, and brickwork are proceeding within the dam for the completion of the remainder of this pier; 302 ft. of the river wall adjacent are brought to heights varying from 1 ft. to 3¾ ft. above Trinity datum. The works to the Adelphi landing-stairs are brought to 1 ft. above, and 398 ft. of the river wall adjoining those works are brought to levels varying from 1 ft. below to 3¾ ft. above that mark. In connexion with the Waterloo Steamboat Pier works up to the junction with the No. 2 Contract, the works generally are brought to levels varying from 1 ft. below to about 1 ft. above Trinity datum. Filling in behind the walls and in the works has been carried out to the extent of about 500,000 cubic yards. The Victoria and Regent-street sewer outlets are complete. Approximately the cost of the whole of these works amounts to about 394,200*l.* Contract No. 2, between Waterloo Bridge and Temple Gardens.—The low-level sewer, subway, and smaller intercepting sewer are complete, the river wall is constructed to its full height, and the parapet is being formed thereon. The new Temple Pier is also approaching completion. The approximate value of the whole of the works completed amounts to about 215,490*l.* Contract No. 3—The drawings are completed. They comprise a viaduct from the eastern end of Inner Temple Gardens to Blackfriars Bridge, and will complete the line of embankment between Westminster and Blackfriars Bridges; but this section of the work awaits certain negotiations pending between the board, the Metropolitan District Railway Company, and the City Gas Works. The roadway along the whole length of the embankment cannot be completed until after the construction of the Metropolitan District Railway. Southern Embankment—A length of about 2,570 ft. of the dam, and 2,870 ft. of the staging is complete, and in the construction of which about 237,000 cubic feet of timber, 13,000 cubic yards of clay puddle, and 185 tons of iron have been used. Within the dam about 240 ft. in length of the river wall have been brought to a level of 1 ft. below, and 2,060 ft. of the wall to levels varying from 1 ft. to 7½ ft. above Trinity high-water mark. For the construction of this wall about 87,000 cubic yards of earth have been excavated, 30,000 yards filled in, 22,000 yards of concrete deposited, 580 yards of brickwork laid, and 123,000 cubic feet of stone bedded. The total approximate value of the work done is 107,000*l.*"

SHOREDITCH NEW VESTRY HALL.

At a meeting of the Shoreditch vestry, held on Tuesday evening, a long discussion took place with reference to the Vestry-hall in course of being erected in Old Street-road. The principal point raised was in respect to the painting of the interior, which, in terms of the contract specification, was required to be "paint in four oils to all stucco work." The contractor having put a solution of vitriol on the wall next the lime, the clerk of the works, Mr. Merrion, condemned it as being contrary to specification, and stopped the work. On the matter coming before the building committee they ordered the paint to be removed and the vitriol size taken off, at the expense of the contractor. The discussion in vestry arose upon the report of the committee. On one side it was contended that the vitriol was used to kill the active properties of the lime, and prevent the paint becoming embedded, so that more paint being made to appear on the surface of the wall when finished than had been used, the desired purpose of the projectors of the building had not been effected. On the other hand, the process was said to be in accordance with the practice of the trade in such cases, and the difference of opinion thus expressed was the real bone of contention. The clerk of the works was called, and he persisted that he had acted properly, and for the interest of his employers, by insisting that the contract should be duly executed according to the terms of the specification. The architect, Mr. C. A. Long, was not present during this discussion, although he had attended the meeting of the committee when it was resolved that the paint should be taken off and the vitriol size removed, which was done with his concurrence. The result of the discussion was, that the vestry adopted the report of the committee, and confirmed the decision at which it had arrived.

CHURCH-BUILDING NEWS.

Northill.—The first stone of All Saints Church, Caldecote, has been laid. The late rector's widow gives 1,000*l.* towards its erection. Mr. Harvey has presented a site, adjoining the school-house, for the church and a burial-ground around it, valued with his subscription at 250*l.* Other contributions bring up the list to about 1,660*l.*, the estimated cost being nearly 2,000*l.* Plans for a church to hold 400, and to be constructed for the most part of brick, after a Romanesque design, have been obtained from Mr. A. Blomfield, of London, and the execution of the works has been entrusted to Mr. Warren, of Stevenage.

East Brixton.—The foundation-stone of St. Jude's Church, Dulwich-lane, East Brixton, was laid by Mr. Joshua Blackburn, of Brockwell Hall, on Saturday last, the 3rd instant. The archdeacon of Surrey delivered the address, the service being read by the Rev. N. A. Garland, assisted by the local clergy. The church will accommodate nearly 1,100 persons, on the ground-floor. One-third of the sittings are free. The building is designed in the Early Decorated style. It is faced with Kentish rag and Bath stone dressings, and is arranged with nave and aisles divided by arcades, sustained on circular stone piers with carved capitals. There are shallow transepts and a deep chancel, the tower and spire being situated in the angle between the end of the north aisle and the side of the chancel. Mr. E. C. Robins is the architect, and Mr. John Kirk is the contractor, whose tender

for the erection and completion of the church is under 6,000*l.*

Pembury.—The parish church of Pembury has been re-opened, after extensive repairs. The restorations have been carried out under the direction of Mr. R. Wheeler, of Brenchley, and embrace the removal of the galleries and high square pews. These have given place to open benches. The walls have been repaired and renovated throughout the building. The east wall has been partially rebuilt, and a new eastern window inserted. A vestry has been erected on the north side of the chancel. The nave roof has been stripped of the plaster which covered the old timbers, and opened to view. A new roof of the same pitch as the nave has been constructed over the chancel, and has taken the place of the former flat plaster ceiling. The internal part is formed in panels and ribs, with moulded principals. All the windows, doorways, &c., have been restored as far as possible in accordance with the ancient work, the old architecture being retained where decay had not rendered this impracticable. The chancel is seated stall-wise, and is raised two steps above the level of the nave. The communion is approached by three steps of polished marble. The floor of the chancel is laid with encaustic tiles, the altar floor and foot pace being composed of different coloured marbles. This portion of the work is the gift of Mr. William Amhurst Tyssen Amhurst, of Didlington Hall, Norfolk, some members of whose family lie interred beneath the sanctuary floor. The reredos is a composition of marble and alabaster. Beneath a carved canopy are inlaid marbles of divers colours, on which are incised the sacred monogram. In the spandrels are carved subjects of the pelican and Agnus Dei. The works have been executed by Mr. Punnett, of Tonbridge, at a cost of about 1,300*l.*, exclusive of gifts in kind.

Beighton (Sheffield).—At a meeting of the inhabitants of Beighton, held in the vestry of the parish church, to consider the propriety of restoring the church, it was resolved that plans for this object, which had been prepared by Mr. S. Rollinson, of Chesterfield, architect, should be adopted. Earl Manvers, the patron of the living, has headed the subscription list with a donation of 500*l.* All the seats in the church, when restored, are to be open and unappropriated.

Manchester.—The last portion of the Philips Park Cemetery,—that to be devoted to the Church of England,—is now so near completion that it has been consecrated by the Bishop of Manchester. The cemetery, of which we have before spoken, has been constructed by the Corporation of Manchester, and occupies the site on which St. Ann's Rectory formerly stood, —to the north of Philips Park, from which it is separated by the River Medlock. Altogether, the corporation purchased about forty-six acres of land, stretching for more than half a mile along the banks of the Medlock. They then advertised for designs for laying out the grounds, and for chapels to be erected; and out of the forty designs submitted, those of Messrs. Paull & Ayliffe, architects, of Manchester, for the chapels and other buildings, and of Mr. William Gay, landscape gardener, Bradford, Yorkshire, for the engineering works and for the laying out of the grounds and approaches, were selected. The main feature of Mr. Gay's plan, which has been carried out, was the fixing of the principal entrance at the north-west corner, being the nearest approach to the city, and the arterial road running from it through the centre of the ground to the eastern end. The approaches and boundary roads have reduced the area within the walls to 41 acres. Of this the western end, 19½ acres in extent, has been appropriated to the Church of England, next 14 acres to the Dissenters, and at the eastern end 7½ acres to the Roman Catholics. Each portion of the cemetery is made complete within itself, having its chapel and lodges, and those appropriated to the Dissenters and Roman Catholics have separate entrances, independent of the main entrance. Though all the chapels are in one style,—the transitional period of Gothic architecture,—each is distinct in design. The whole of the buildings are treated rather severely, no elaborate ornamentation being permitted. Mr. W. Storr, of Stalybridge, was the contractor. The road making, drainage, and earthworks have been carried out by Mr. Israel Thornton, under a schedule of prices; and the laying out and planting by the corporation, who employed a number of cotton operatives who had been thrown out of work during the cotton famine at day labour The total cost of the cemetery, including land' buildings, engineering works, &c., is estimated at about 60,000*l.* Since the dissolution of partnership between Messrs. Paull & Ayliffe, the works have been completed under the superintendence of Mr. Paull.

Ipswich.—At a vestry of the parish of St. Margaret, Ipswich, it has been resolved "that Mr. Barnes, the architect, be requested to survey the church at California to ascertain what amount would be required to put it into repair and what amount would be requisite to enlarge it so as to hold 400 persons and in order to make it suitable for consecration by the bishop."

Leicester.—The spire of St. Martin's Church is now completed. The total height of tower and spire, from the floor-line to the top of the vane, is 218 ft. 6 in., the tower being 107 ft., and the spire 111 ft. 6 in. The style is Early English, to correspond with the tower, lately restored. The architect was Mr. Raphael Brandon, of London, and the work has been carried out by Messrs. W. Neale & Sons, of this town. The weathercock was put on by the vicar.

DISSENTING CHURCH-BUILDING NEWS.

Liverpool.—The foundation-stone has been recently laid of a Wesleyan Chapel at Old Swan, near Liverpool. The building will be in the Gothic style, of red sandstone, and contain 478 sittings. It will have a large school-room and a minister's vestry at the back, and three class-rooms on the basement. The estimate is 2,117*l.* 10*s.* This includes the cost of heating, boundary-wall, and fittings. The architects are the Messrs. Green & Parslow, of Liverpool, and the contractor is Mr. John Westmorland, also of Liverpool.

Scarborough.—The exterior of the new Baptist Chapel, which was recently opened, is designed in the Geometric Decorated style of Gothic architecture, and its site is the centre of Albemarle-crescent. The south-east corner of the principal front is occupied by a tower and spire, rising to a height of 110 ft. The windows of the upper stage of the tower are moulded, filled in with tracery, and surmounted by crocketed canopies rising high up the four faces of the spire. The centre portion of the façade consists of a vestibule entered by triple arches springing from circular shafts with moulded bases and bands and sculptured capitals. From this vestibule the entrances to the ground and gallery floors of the chapel are reached. Above the arched vestibule is a large six-light window, filled in with tracery. The façade is flanked by the gallery staircases. The materials used are Bradford Wall stones, with dressings and spire of Whitby ashlar. Internally the chapel consists of a nave and aisles, divided by iron columns, and supporting an open-timbered roof. The transepts correspond in height with the nave, and have each a large five-light tracery window; while behind the pulpit is an ornamental baptistery with an apse end, the three two-light openings of which are filled in with memorial windows. Vestries are situated in each side of the baptistery, and a large lecture-room is built on the ground behind. An organ-chapel, a minister's vestry, and a gallery across one end of the chapel complete the accommodation provided, which is for 750 people. The cost of the building, including the land, is estimated at 5,500*l.*, and it has been erected by Mr. John Barry, contractor, of Scarborough, from the designs of Messrs. Lockwood & Mawson.

Buckley.—A new Wesleyan chapel is to be built for Buckley. The edifice is to be situated on land given for the purpose by Mr. Craven. Its dimensions will be 56 ft. by 36 ft. and it is calculated to seat 300 persons. The style will be a modified Gothic. The architect is Mr. Krolow. The total cost is estimated at about 600*l.*

Walsall.—The memorial-stones of a new Wesleyan chapel, intended to be built at the corner of Queen-street and Bridgman-street, have been laid by four ladies. The new structure is designed and will be built by Mr. J. Wilkes, of Darlaston. It will partly supplement and partly supplant a school chapel, which was built on an adjacent plot of land nearly three years ago, and which, on the completion of the new structure, will be used for school purposes only. In style it will be a mixture of Gothic and Italian and, as regards capacity, it will seat 350 persons. At present there will only be one end gallery for the school-children put up; but the building will be so arranged as to admit of the addition of side galleries hereafter. The total outlay is set down at 900*l.*, rather more than one-half of which has now been raised.

Hanley.—The corner-stone of a Methodist New Connexion chapel has been laid here. The Building Committee engaged the services of Messrs. Scrivener & Son, of Hanley, architects, to design a suitable edifice, at a cost of something like 2,000*l.*, more than one-half of which amount has already been raised. The chapel will be 72 ft. long, 37 ft. wide, and 36 ft. from floor to ceiling. The style is Gothic of the thirteenth century. It will be built with white bricks and stone dressings. The main front (which is south) is gabled, and has a series of six windows, with lancet heads, divided by columns with moulded caps and bases. Above this is a four-light traceried window. On the east side of the front is a porch entrance. The porch is carried up as a tower, and has stone pinnacles with carved finials rising from the angle buttresses. At the west corner is a square tower, with angle buttresses, rising to a height of 46 ft., and from the tower is a spire rising to the height of 76 ft., making a total height of 122 ft. This tower is the principal entrance to the chapel. A doorway with columns and deeply recessed mouldings is the main feature. The sides of the chapel are formed into bays by buttresses with stone weatherings. In each bay is a single-light window with traceried head. The interior is fitted up with open benches in red deal, and with a rostrum of novel design. Behind the rostrum are the vestries and organ-gallery and choir. There is a gallery at the south end; the gallery fronts are framed in quatrefoil panels, which are filled in with crimson cloth. The roof is open timbered, the spandrels being filled in with open tracery. The ceiling is pentagonal in section and covered with red deal boards; all the wood-work is stained and varnished. The heating is by hot air, and the system of ventilation is what is now termed the "natural," the fresh air being admitted through ducts covered with wire gauze, and the vitiated air carried off through the ceiling into the apex of the roof, and thence into the atmosphere. The chapel is being erected by Mr. C. Wooldridge, of Hanley.

Whitby.—The commencement of the new Congregational Church, West Cliff, Whitby, has been celebrated by a devotional service on the site. The foundation stone will be laid on September 11th, by Mr. S. Morley, of London, who has contributed 300*l.* in aid of the building fund. It is expected that the church will be opened for worship in twelve months. The architect is Mr. Pritchett, of Darlington, and the builder Mr. R. Robinson, of Whitby. The total cost of the building, including land, will be about 4,000*l.*, 1,400*l.* of which have yet to be raised.

SCHOOL-BUILDING NEWS.

Tamworth.—The foundation-stone of the new Grammar School at Tamworth has been laid by the Marquis Townshend, who, as Viscount Raynham, represented the borough in Parliament for some years. The site is on the outskirts of the town, on the Ashby road. The position is elevated. Considerable delay has taken place in the erection of the building, owing partly to Sir Robert Peel, the senior member for the borough, having taken objections to the site and other points in the proposals of the trustees, and besides urging his views upon the Charity Commissioners, having addressed meetings at Tamworth on this and other local topics. The right hon. baronet moved in the House of Commons for the correspondence on the subject with the Charity Commissioners to be printed, and the blue book containing this was, with the newspapers of the day and coins of the present reign, deposited in a cavity of the stone. Mr. Nicholas Joyce, of Stafford, was selected as architect; and the building is being erected according to his designs by Mr. Charles Clarson, of Tamworth, builder, for 2,800*l.* The walls were up a considerable height when the ceremony took place. The front of the building is about 140 ft. in length. In the centre is the master's residence, with sitting-rooms, dormitories, and other accommodation for twenty-five boarders. At the north end are the servants' apartments and domestic offices, and at the south end the schoolroom, 42 ft. long and 20 ft. wide. On the ground-floor is a large room in which the public library will be placed. This is an old library belonging to

the town. The building will be of Gothic character, the walls faced with pressed bricks, enriched with dressings of Bath stone, and the roofs covered with Staffordshire tiles, in ornamental patterns.

Carlisle.—The new schools in connexion with the recently erected church of St. Stephen's, in this city, have been formally opened. The building has been erected at the west end of the church. It is of brick, faced with white stone. The building consists of three rooms. The architect was Mr. Jas. Nelson, jun., of this city, who also designed the church; and Mr. Milburn, of this city, was the builder.

STAINED GLASS.

St. Thomas's, Rhyl.—An east window has been presented to this church as a memorial of the help and sympathy given by the Bishop of St. Asaph in its erection. Messrs. Ward & Hughes were the artists.

Rastrick Church.—A memorial window has been placed in the parish church of Rastrick, near Brighouse, Yorkshire, in memory of the son of Mr. Thomas Bradbury, Longroyde, Brighouse. The window is composed of two lights, crowned by a transom, and contains in the lower division two subjects, namely, the "Nativity" and the "Presentation in the Temple," framed by canopies and mosaic borders. The upper parts of the window are filled with medallions, containing angels; and the base is formed with mosaic work, under which is placed the inscription. The window is from the works of Messrs. R. B. Edmundson & Son, of Manchester.

Books Received.

Irrigation in Spain. By J. P. Roberts, C.E. London: Spon. 1867.

The author has compiled this essay from information collected during a residence of several years in Spain. He is of opinion that irrigation works, when properly carried out with a due regard to economy, must, besides being highly beneficial to landed proprietors and farmers, be exceedingly remunerative to those who embark their capital in them, if the district to be irrigated be judiciously selected. The Rioja district of Spain, in which he resided for five years, has for centuries been irrigated, and there the subject is thoroughly understood. He was professionally engaged for some time in examining projected irrigation works; and as he believes very little is known on this subject in England, he rightly says that his notes contain matter of sufficient importance to merit publication, especially in connexion with the agricultural improvement of our possessions in India.

VARIORUM.

"Symons's Monthly Meteorological Magazine" (Stanford, Charing-cross) for August contains some useful information on rainfall, especially the first paper, on the excessive rainfall of 26th of July last, which is illustrated by a map and useful tabular details, given by various observers in the vicinity of the Thames and Medway, showing the enormous amount of rainfall in some places compared with others not far off. Thus while at Strathfield Turgiss, Winchfield, Hants, the Rev. C. H. Griffith found the amount of rainfall on that occasion to be 1·25 in.; and at Piercelands, West Hoathley, Sussex, Mr. J. Dudgeon records 1·33 in.; Dr. Ballard at Compton-terrace, Islington, Middlesex, gives 2·22 in.; Mr. J. Glaisher at Greenwich Observatory, Kent, records 3·67 in.; and Mr. W. Bland at Hartlip, Sittingbourne, in Kent, 5·04 in.! The value of these observations is great.—— "Stevens & Hole's School Series: The Standard Arithmetical Copy-book. By Henry Combes & Edwin Hines." Longmans & Co. "Stevens & Hole's School Series: The Complete Writer. By Henry Combes, E. T. Stevens, & C. Hole." Longmans & Co. The first of these series of school books forms a carefully-prepared course of arithmetic, advancing step by step from the simplest elements to the higher branches of the science, arranged so as to ensure good figures, concise methods, and correct results. There are nine of them. The principle upon which the whole course is constructed is that of showing, *by example*, how the work should be written out, and then leading the pupil step by step to do similar work for himself. The idea is a decidedly good one, and will probably be found far more effectual than the older or more usual modes. "The Complete Writer" comprises a course of sixteen carefully graduated narrative copy-books, designed to lead to good and correct writing for upper and middle class schools. The poetical and other selections given as copies are a great improvement on the old jog-trot system.

Miscellanea.

Wroxeter.—The excavations at Wroxeter have been proceeding for more than three weeks by the liberality of Mr. Meyer. Three or four men have been employed in clearing out the ground on the north angle of the buildings generally termed the enameller's workshop, and between this, and what has been supposed to have been, a *basilica*. A good many feet of ancient wall have been laid open, and are being measured and laid down to a scale by Mr. H. Davies, and much curious subterranean building has been discovered. Various articles have been found, almost all of which are, by this time, to be seen in the Museum.

Furnace Chimney.—A chimney has been built at the works of the West Cumberland Hematite Iron Company, near Workington, from a design by Professor Rankine; the builders are Messrs. William Wilson & Son, of Glasgow. The following are the principal dimensions: height above ground level, 250 ft.; depth of foundation below ground level (including a bed of concrete 3 ft. deep), 17 ft.; basement, 30 ft. square at the bottom, diminishing to an octagon at the ground level, pierced by four apertures for flues, each 7 ft. 6 in. in diameter; outside diameters of cone, at bottom, 25 ft. 7 in.; at top, 15 ft. 3 in. The cone has a straight batter of 1 in 48; thickness of brickwork in cone, 2½ bricks at bottom, diminishing by steps inside to 1½ brick at top, and including fire-brick lining.

Towns' Sewage.—An important Bill, known by the title of "The Sewage Utilisation Act of 1867," for facilitating the distribution of town sewage for agricultural purposes, has just been printed, in the form in which it left the House of Commons. Briefly stated, its provisions empower Local Boards to provide any works for receiving, storing, disinfecting, or distributing sewage within their respective districts; and in districts where no Local Boards exist, a special authority may be created for the purpose. Such Boards or authorities may purchase any requisite lands, and for agricultural objects may lease land for a period not exceeding seven years, or may contract to share the produce, or farm it and dispose of the produce. Different districts may unite for these ends. Authorities under the Act may also agree to contribute to any outlay on the part of private capitalists or public companies for carrying sewage plans into execution, and, as regards companies, may become shareholders. All assessments under the Act are to be included in the poor-rates.

Fall of a House in Liverpool.—A portion of a house situated in Prescot-road, Old Swan, nearly opposite the police-office, has fallen. At the rear is a chasm between 40 and 50 ft. deep, evidently an old quarry, and the back parts of the houses project over this, and are supported by massive stone pillars. It is supposed that the foundations of those pillars were not sufficiently firm to sustain the superincumbent weight, and that those supporting Mr. Haskayne's house sunk, and so caused the catastrophe. A police-constable named Eastham, on being informed that there was a female inside unable to get out and in danger, at once ascended to the upper floor as quickly as he could, snatched the young woman out of bed, and brought her down in his arms. He narrowly escaped, for just as he had reached the foot of the stairs the flooring gave way beneath him, and he and his burthen would certainly have fallen into the frightful pit beneath had not five or six of the more courageous of the crowd rendered their assistance, and dragged them both out. The adjoining houses of the row appear also to be in a very dangerous state, the pillars supporting them to the rear not seeming to be in a reliable condition, and cracks in the walls, sinking of floors, and other unpleasing signs, give strong indications of danger.

Carelessness in Stacking Bricks. — Three boys have been buried by a stack of falling bricks at the Liverpool new Exchange buildings, but fortunately they were rescued without loss of life.

Fire in a Church at Venice.—A great fire has occurred here in the Church of St. John and St. Paul, Venice. Titian's painting of Peter the Martyr and many other master-pieces of art were burned.

White Lead.—An invention has been provisionally specified by Mr. Bonniville, of Paris, for obtaining white lead direct from the ore, by pouring the molten metal into cold water, to render it as porous and bulky as possible; it is then dissolved in sulphuric acid, and the sulphate is treated with pyroligneous or oxalic acid, combined or not with tincal dissolved in water, and next dried over the fire on trays. The vessels employed are either made of stone or wood, lined with lead.

Glass Walls for Fruit Trees.—A contrivance for more thoroughly ripening fruit, noticed or suggested in the *Builder* some years ago, has been introduced in this shape. Small bars of wood are driven into the earth about 3 ft. from an ordinary brick wall, and being grooved easily receive plates of glass. The fruit trees are trained against this glass wall on the inside, and so besides the light and heat obtained on the one side through the glass get the reflected heat from the wall opposite. With two glass walls about 4 ft. apart in the open trees can be trained on the insides of both, and in either case the tops can easily be covered in case of frost.

The New Bunhill-fields Park.—Agreeably to the new Act, which has just received the Royal assent, for the preservation of Bunhill-fields burial-ground, the Corporation of the City of London is now to perform its part in the implied contract, and convert the burial-ground, which contains the bones of so many eminent men, into a public garden or "park." Bunhill-fields possesses a large area of ground, capable of being converted into a place of recreation for resident citizens, of park-like dimensions, and we hear it will receive the name of "Bunhill-fields Park." It is to be hoped that the tombs of Bunyan, De Foe, and the other worthies there will be duly cared for.

Portable Hen Houses.—M. Giot has invented a "fowl-omnibus." One of these perambulating hen-houses is to be seen at the Paris Exhibition. M. Giot puts nest-boxes and perches into a broken-down 'bus, fills it with fowls, and wheels it out into the fallows and plough lands. The *Houdans* and *Crêvè-cœurs* feed themselves entirely, follow the plough or harrow, clear the land thoroughly of worm and fly, pick up all the stray grain after harvest, manure the soil, lay innumerable eggs, rear hardy broods, and make capital poultry for the table, all without cost or trouble, beyond the necessity of trundling them now and then to a new spot.

Preparation of Whitewash.—Whitewash is one of the most valuable articles in the world when properly applied. It not only prevents the decay of wood, but conduces greatly to the healthiness of all buildings, whether of wood or stone. Out-buildings and fences, when not painted, should be supplied once or twice every year with a good coat of whitewash, which should be prepared in the following way:—Take a clean water-tight barrel, or other suitable cask, and put into it half a bushel of lime. Slake it by pouring water over it, boiling hot, and in sufficient quantity to cover it 5 in. deep, and stir it briskly till thoroughly slaked. When the slaking has been thoroughly effected, dissolve it in water, and add two pounds of sulphate of zinc and one of common salt: these will cause the wash to harden and prevent its cracking, which gives an unseemly appearance to the work. If desirable, a beautiful cream colour may be communicated to the above wash, by adding three pounds of yellow ochre; or a good pearl or lead colour, by the addition of lamp, vine, or ivory black. For fawn colour, add four pounds of umber—Turkish or American, the latter is the cheapest—one pound of Indian red, and one pound of common lamp black. For common stone colour, add four pounds of raw umber, and two pounds of lamp black. This wash may be applied with a common whitewash brush, and will be found much superior both in appearance and durability, to the common whitewash.—*Albany Country Gentleman.*

Gold for the Mormons.—A communication from the Salt Lake, dated the 10th of July, speaks of great excitement, owing to rich discoveries of gold near the South Pass, some 250 miles from the city. The mines are *said* to exceed any others ever found on the American continent for value and extent.

The Public Park at Halifax. — Sir F. Crossley, bart., who in 1857 presented to his fellow-townsmen a People's Park, which cost 30,000*l*., has commemorated the tenth anniversary of the opening by presenting to the town of Halifax a sum of 6,300*l*., the interest to provide salaries to park-keepers and other expenses.

Opening of the New Railway between London and Edgware.—A want which has long been felt,—viz., the establishment of direct communication by railway between the metropolis and the extreme northern districts,—is supplied by the opening of the new London and Edgware line by the Great Northern Railway Company.

Restoration of the Crystal Palace. — We are told that a contract has been made with the Hamilton Windsor Ironworks Company of Liverpool, for the erection of 145 ft. of the north end of the Crystal Palace, destroyed by fire, bringing the restored part up to the spot at which the north transept formerly stood. The work is to be completed by November.

Value of Property in Liverpool.—In the Sheriff's Court, St. George's Hall, before Mr. J. J. Aston, assessor, and a jury, an arbitration case between the Corporation and certain owners of property in Church-street has been heard. Mr. Lloyd stated the nature of the claim. He said the premises were required by the Corporation for the purposes of improvements in Church-street. It was obvious that they did not want the whole of it, but they desired to recoup the ratepayers the outlay they were about to make by purchasing the whole block, and then reselling a portion of it. A number of witnesses were examined on both sides. The area of the premises was 378½ yards, with a frontage to Church-street of 49 ft. 2½ in. Mr. Wordley estimated the value of the land at 50 guineas per yard, or 22,128*l*. for land and buildings. Mr. T. J. Kilpin 22,321*l*.; Mr. Hornblower, 22,011*l*.; and Mr. Cunningham, 21,825*l*. For the Corporation, Mr. Culshaw, on being examined, stated it as his opinion that the value of the ground was 16,005*l*., which was an average of 42*l*. 4s. a yard; by one calculation out of three he made it 12,038*l*. Mr. W. Scott valued the land at 15,832*l*.; Mr. P. Ellis, 14,367*l*.; and Mr. James Holme, 15,120*l*. The jury found for the claimants, 18,500*l*. compensation.

Excavations in Sanday, Orkney. — Mr. Farrar has discovered an ancient building apparently of the "brough" order, at the Brough of Quoyness, in the island of Sanday. The mound is 63 ft. in diameter and 12½ ft. in height. The building has been 32 ft. in diameter, and there is a space of 12 ft. between an inner and an outer wall, thus leaving a sort of area or court encircling the whole building. Outside this outer wall is another, regularly built, leaving a space of 3½ ft., which is filled with loose stones. Mr. Farrar thinks the object was to strengthen the original wall. On the south-east side of the mound there is a passage 12 ft. long by 3 ft. high and 21 in. wide, covered with large stones set on edge. This passage communicates with a large oblong chamber in the centre of the mound. This chamber is 11 ft. 10 in. long, 4 ft. 5 in. wide, and 12 ft. 6 in. deep. Within the wall on the north-west side are two kists of a semicircular shape, 19 in. wide at the entrance, and 6 ft. high inside, and 5 ft. respectively. They contained no bones. On the right of the entrance passage there is a kist 20 in. wide and 6 ft. high, and on the left another probably of the same dimensions but not yet cleared out. Both of these kists contained skulls and a few other human bones. There were also other human remains found in course of the excavations. Mr. Farrar says, "it would be difficult to determine positively whether the mound was, in its *original* state, a burial-place. It *may* have been a brough, and the space between the inner and outer walls—which I suppose to have been an open area—may have been a mass of rude walling constructed with the view of supporting the building in which the graves are found. Further excavations can alone settle this point."

Laying on Fresh Air.—A Mr. Thomas has a scheme by which he proposes to revivify London by means of fresh-country air, conveyed in pipes, cooled by passing through tunnels and ice houses! Nature would do this for us, if we would but let her.

Tin-lined Lead Water-pipes.—Experiments have been made at New York with these pipes, and the pipes, as well as the experiments, are thus described in the *Journal of the Franklin Institute*:—"A solid cylinder of tin, weighing, say, 15 pounds, is bored of a certain diameter. It is then placed in a larger cylinder, having poured around it melted lead. A powerful hydraulic press forces it through a gauge, just as in wire drawing, a steel rod forming, as it were, the core. The line of contact of the lead and tin is clearly defined, and the pipe is a very perfect one. The following are the results of some of the experiments:—An ordinary leaden pipe, 1 in. interior diameter, and weighing 4 pounds 11 ounces per foot, burst at pressure of 1,000 pounds on gange. A tin-coated pipe, of like capacity, but weighing only 2 pounds 6 ounces per foot, required 1,150 pounds to burst it. A ¾-in. lead pipe, weighing 3 and 8-10ths of a pound per foot, required a pressure of 1,200 pounds before bursting. A tin-coated pipe of the same calibre brought the dynamometer up to 1,275 before bursting. This last weighed only 1 and 12-100ths pounds per foot. About the same ratio was kept up with other sizes experimented upon, showing a great saving in weight, with a commensurate gain in strength."

TENDERS

For farm buildings at Heath and Reach, Leighton Buzzard, for Mr. John Bushell. Mr. F. Gotto, architect:—

Miles	£560 0 0
Dimmock & Adams	540 0 0
Barker	527 0 0
Dimmock	525 0 0
Adams & Gibbons	490 0 0

For the erection of national schools and master's residence, at St. Harmon's, Radnorshire. Mr. E. H. Lingen Barker, architect:—

Evans	£399 11 0
Woolley	395 13 0
Edwards	394 0 0

For Small Heath Congregational Chapel near Birmingham. Mr. W. F. Poulton, architect:—

Barnsley	£2,629 0 0
Hardwick	2,505 0 0
Briggs	2,530 0 0
Webb	2,519 0 0
Partridge	2,500 0 0
Smith	2,498 0 0
Mathews	2,445 0 0
Bennett	2,395 0 0
Horsley	2,316 0 0
Jones (accepted)	2,249 0 0

Tenders for main drainage works, Southampton, consisting of covered reservoir, main outlet, &c. Contract No. 2. Mr. James Lemon, engineer. Quantities supplied by Mr. Howell and Messrs. Rake & Ranwell:—

Sibsey	£10,683 0 0
Nowell	9,330 0 0
Mackenzie & Abell	8,856 0 0
Furniss	8,750 0 0
Wainwright	8,400 0 0
Sanders	8,270 0 0
Ball & Sons	6,968 0 0

For new warehouse in Park-street, Southwark. Messrs. Newman & Billing, architects. Quantities supplied by Mr. Edsall:—

Axford & Whillier	£6,095 0 0
Simms & Marten	5,985 0 0
Downs	5,890 0 0
Ashby & Horner	5,831 0 0
Little	5,698 0 0
Perry	5,695 0 0
Thompson	5,640 0 0
Greenwood	5,598 0 0
Rider	5,580 0 0
Coleman	5,340 0 0
Wells	5,300 0 0
Brass	5,247 0 0
Browne & Robinson (accepted)	5,192 0 0

For alterations to the Queen's Arms, Notting-hill, for Mr. Haynes. Mr. W. H. Lamborn, architect:—

Gallienne	£398 14 0
Martin	338 0 0
Petters (accepted)	314 10 0
Sporle	246 14 0

For warehouse in Coleman-street, Bunhill-row. Mr. H. S. Hammon, architect:—

Turner & Sons	£1,567 0 0
Macey	1,533 0 0
Ennor	1,488 0 0
Browne & Robinson	1,476 0 0
Henshaw	1,462 0 0
Webb & Sons (accepted)	1,430 0 0

For finishing and completing houses at Low Leyton:—

Munday & Hutchinson	£2,760 0 0
Harris	2,575 0 0
Mansfield	2,536 0 0
Fisher	2,456 0 0
Cubitt	2,937 0 0
Warne	1,930 0 0
Cogswell	1,928 0 0

For stabling and alterations to the White Lion, Central-street, St. Luke's, for Mr. Gardner. Mr. James Schofield, architect:—

Saby	£342 3 0
Perkins	305 0 0
Grover	298 0 0
Laurence & Baugh	297 0 0
Eton & Chapman	290 0 0

For additions and alterations at No. 12, Wilton-crescent, S.W., for Mr. Henry W. Bull. Messrs. C. Habershon, Brock, & Webb, architects:—

Manley & Rogers	£533 0 0
Bowman	493 0 0
Eborall	490 0 0

For church and schools at Tottenham. Messrs. Smith & Son, architects. Quantities not supplied:—

	Church.	Schools under
Adams	£4,180 0 0	£3,365 0 0
Barker	3,958 0 0	3,218 0 0
Nightingale	3,957 0 0	3,125 0 0
Blackmore & Morley	3,583 0 0	2,800 0 0
Crabb & Vaughan	3,400 0 0	2,550 0 0
Mundy & Hutchinson	3,153 0 0	2,403 0 0
Palmer	2,820 0 0	2,179 0 0

For house and shop at Twickenham, for Mr. Clark. Mr. Marshall, architect. Quantities not supplied:—

Jackling	£636 0 0
Mundy & Hutchinson	618 0 0
Whittles	609 0 0
Hazell	545 0 0

For alteration to the Victory Tavern, Albany-street, Regent's Park. Mr. William Munn, architect:—

Batchelder	£833 0 0
Selleck	765 0 0
Langmead & Way	649 15 0
Chutter	649 0 0
Auley	595 0 0
Lamble	569 0 0

For the erection of houses and shops in the Forest-road, Cindesford, Gloucestershire, for Mr. Hiram Bennett. Mr. Edwin J. Reynolds, architect, Cindesford:—

Durke (accepted)	£369 0 0

Bar fitting, Queen Victoria, Clapham Junction. Mr. William Munn, architect:—

Auley (accepted)	260 0 0

For erecting timber stage, exclusive of timber in baulk, for Mr. C. B. N. Snewin, Hatton-garden. Mr. Johnson, architect:—

Crabb & Vaughan (accepted)	£220 0 0

For the construction of new brick sewers in St. James's-street and Thomas-street, Notting-dale, for the Kensington Vestry. Mr. James Broadbridge, surveyor:—

Waggett & Barnett	£2,864 2 3
Wainwright	2,400 0 0
Reeves & Steggles	2,203 0 0
Crockett	2,180 0 0
Alleock & Cooper	2,100 0 0
Goodair	1,881 0 0
Thirst & Co.	1,869 0 0
Wigmore	1,794 0 0
Thackerah	1,750 0 0
Williams, Brothers	1,750 0 0

For the construction of brick and pipe sewers at Hernehill, Denmark-hill, Woodland-hill, Norwood; Park-road, Norwood; Denmark-road, Coldharbour-lane, and Acre-lane, Brixton, for the Lambeth Vestry. Mr. Hugh McIntosh, surveyor:—

Girdler	£15,104 0 0
Munroe	13,354 0 0
Pearson	13,000 0 0
Crocket	12,900 0 0
Blackmore	12,250 0 0
Wainwright	11,950 0 0
Burton	11,900 0 0
Thackerah	10,85[illegible] 0 0
Hitchcox & Co.	10,850 0 0
Wigmore	10,520 0 0
Mutton	10,400 0 0
Mayo	10,276 0 0

For rebuilding the Angel and Crown, Tabernacle-square. Mr. H. J. Hammon, architect. Quantities supplied:—

Patrick	£1,191 0 0
Mann	1,187 0 0
Turner & Son	1,077 0 0
Henshaw	1,074 0 0
Longmead & Way	1,048 0 0
Eaton & Chapman	1,030 0 0
Preedy (accepted)	948 0 0

For alterations to the Jolly Coopers, Clerkenwell-close, for Mr. Fulloom. Mr. T. F. Fillary, architect. Quantities not supplied:—

Sabey	£1,875 0 0
Longmead & Way	1,786 0 0
Bamford	1,600 0 0
Hawkes & Co.	1,075 0 0 !

For a villa residence on the Norbury Park Estate, West Croydon. Mr. J. H. Rowley, architect. The quantities supplied by Mr. T. T. Green:—

Piper & Wheeler	£1,999 0 0
Browne & Robinson	1,942 0 0
Kilby	1,895 0 0
Brass	1,858 0 0
Bayes	1,817 0 0
Kilby, Brothers	1,811 0 0
Perry & Co.	1,800 0 0
Webb & Sons	1,741 0 0
Hill & Keddell	1,706 0 0
Tully	1,695 0 0
Carter & Son	1,674 0 0
Henshaw	1,560 0 0
Crabb & Vaughan (accepted)	1,482 0 0

For a pair of villa residences, Clytha-square, Newport, Monmouthshire, for Messrs. Goss & Salter. Mr. B. Lawrence, architect:—

Milles	£1,500 0 0
Price	1,465 0 0
Durke (accepted)	1,438 0 0

For small house at Leighton Buzzard for Mr. James Pettit. Mr. F. Gotto, architect:—

Barker	£369	10	0
Whiting	369	0	0
Dawson	365	0	0
Garside	341	0	0
Edwards	336	0	0
Cook	335	0	0
Miles	320	0	0
Lamb	319	0	0

For erecting two houses, Engineer-road, Woolwich Common, for Mr. G. Hebden. Messrs. Gosling & Son, architects. Quantities not supplied:—

Smart & Pinegar	£492	0	0!
Vickeray	475	0	0
Wise	380	0	0
Brett & Bradbury	367	0	0
Ledbitter	350	0	0
Thompson	330	0	0
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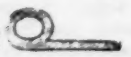

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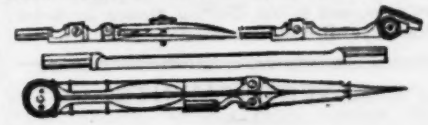

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